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GUIDELINES FOR LOCAL GOVERNMENTS ON SOLID WASTE MANAGEMENT

National Association of Counties Research Foundation

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guidelines for local governments on solid waste management

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guidelines for local governments
on
solid waste management

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foreword

The public creates solid wastes, discards them, and expects efficient, effective, economical, uncomplicated, and nuisance-free collection and disposal. Unfortunately, enough mismanagement of solid wastes exists in the average community to stimulate significant negative reaction. Since solid wastes disposal is a distasteful subject to many people, usually the general public does not comprehend the difficult problems involved in collection and disposal.

Public information programs are important because they can reverse the trend, changing criticism to public support. Positive images and impressions can replace negative ones. For example, most people are interested in conservation of natural resources and community improvement while they have little interest or sympathy with the mundane procedure of collecting and disposing of wastes. Many people can develop an empathy for the dilemma of the sanitation engineer when introduced to contemplated improvements in techniques and facilities.

In other words, the public information efforts of the community should stress positive factors to counteract the negative impressions caused by problems such as:

- poor household storage
- infrequent, annoying, or undependable collection
- open dumps
- air pollution from burning dumps or incinerators
- abandoned automobiles
- litter.

The best method of doing this is for the local government to adopt a posture of progressive and effective operation, and to communicate this attitude of success in every possible way. This guide provides some public information methods to gain and maintain public support and interest.

—SAMUEL HALE, JR.
Deputy Assistant Administrator
for Solid Waste Management

acknowledgments

The research and working drafts for the Guidelines were prepared as follows:

Patricia A. McDonough:
1. Areawide Approaches
4. Organization
5. Design and Operation
8. Citizen Support

Bambridge Peterson:
2. Legal Authority
3. Planning
6. Financing
7. Technical and Financial Assistance

Aliceann Fritschler:
9. Personnel
10. Action Plan and Bibliography

preface

Garbage, trash, rubbish, litter, abandoned automobiles, and the various other discards of civilization called "solid wastes" can no longer be ignored or indiscriminately dumped or burned. Local governments must act now to protect the public health and the environment through what the professionals call "solid wastes management," commonly called garbage collection and disposal.

The National Association of Counties Research Foundation (NACORF), under contract to the Bureau of Solid Waste Management of the U.S. Public Health Service, has prepared these ten guides on Solid Waste Management to assist local elected and appointed policy making officials. The guides are designed to present in clear, concise form information to help local officials and interested citizens make decisions on the planning, organization, financing, staffing, legal aspects, and operation of comprehensive areawide solid wastes management systems.

The environment must be protected against pollution caused by mismanagement of solid wastes. The air, water, and land resources of our country must be preserved. Action is required of every local elected official.

Bernard F. Hillenbrand, Executive Director
National Association of Counties

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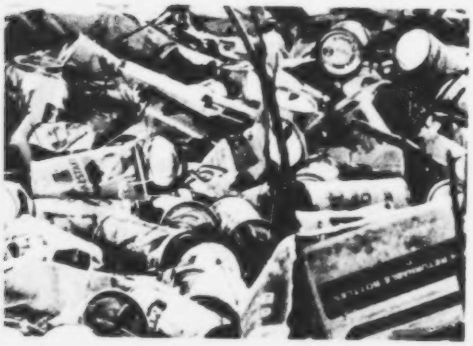
1 areawide approaches

areawide approaches



introduction

Local elected officials have an obligation to see that all solid wastes are managed properly. To get the job done, they must plan, implement, and/or regulate an effective solid wastes management system that will provide citizens the best level of service without jeopardizing health or creating pollution now or in the future. An adequate system requires responsible policy making, firm enforcement, land-use coordination, and logical organization.

The geographical area for a comprehensive solid wastes management system must include current and anticipated sources of solid wastes (homes, businesses, farms, and factories) and space suitable for disposal sites for at least 20 years. As an areawide government, the county provides economies of scale, a broader tax base, closer ties with state government, and potentially more land for disposal than does a municipality. The county governing body usually is the appropriate unit of government to plan, initiate, and regulate a comprehensive areawide system. An effective program requires a county to work with the municipalities within it and sometimes with neighboring cities and counties.

These ten guides are written for the local governing board member in non-technical language to describe what constitutes good solid wastes management and what must be done to develop such a system. Since the organization, size, and powers of counties vary widely across the country, not all of the approaches discussed in these guides will be appropriate for every county. The solid wastes problems of a large metropolitan county differ from those of a small rural county, but the general principles for a solid wastes management system remain the same. Each county's elected governing body must decide what kind of program is best for its own needs.

Guide Number 1, Areawide Approaches covers the relationship of solid wastes management to environmental quality control and points out the need for an areawide approach to insure the adequacy of a comprehensive program. Guide Number 1 also discusses the advantages of intergovernmental cooperation. Other guides in the series treat legal authority, planning, organization, design and operation criteria, financing, financial and technical assistance, citizen support, personnel, and an action plan.

It is important to understand that the term *solid wastes* includes anything thrown away, such as garbage, rubbish, trash, litter, junk, and refuse from any source (homes, businesses, farms, industries, or institutions). *Garbage* is food waste and will decompose. In these guides, *garbage* will mean exactly that. *Rubbish* and *trash* include combustibles such as paper, wood, yard trimmings, and boxes, and noncombustibles such as metals, glass, and

environmental health program

Fresno County, California

The climate and geographical location of San Joaquin Valley and the rapid population growth taking place there have resulted in increased air, water, and land pollution. In 1968 the University of California at Santa Cruz sponsored three valley-wide conferences which were successful in stimulating interest and county action for pollution control. The Fresno County Board of Supervisors and the Fresno County Council of Governments then held a series of three one-day conferences involving civic leaders, junior college faculties, businessmen, media representatives, government officials, and administrative personnel to familiarize them with pollution abatement requirements and procedures, to encourage discussion of mutual problems, and to establish an overall plan. The plan includes standards for water, air, and land pollution control as well as an enforcement program.

In addition, specific improvements are being implemented. Each community is enforcing regulations to prohibit open burning. Investigation has begun to find appropriate sites for long-range disposal of solid wastes. Plans are also being made to test various uses of compost made from industrial agricultural wastes.

Members of the Board of Supervisors and the council of governments, through public appearances and statements in the newspapers and on radio and television, have continued to create public awareness of the need for pollution abatement.

dirt. *Litter* is any piece of discarded solid waste which is exposed and uncontrolled. *Junk* refers to anything currently valueless. *Refuse* includes garbage and trash as well as all other solid or semi-solid wastes such as sewage sludge, abandoned motor vehicles, dead animals, demolition rubble, and street sweepings. All of these descriptive terms are often used imprecisely. Therefore, to avoid confusion, in these guides *solid wastes* will be the only all-inclusive term used.

environmental quality

In an address before an Environmental Solid Waste Orientation Seminar in Kentucky, January 18, 1967, Assistant Surgeon General Richard A. Prindle described the interrelationship of solid wastes management, clean water, and clear air:

> Our earth has only three waste repositories. They also are reservoirs for all the essential life resources we possess—air, water, and land. Our habit has been to think of them as limitless. But at the rate our populations are growing, we can begin to view with real concern the fact that the earth has no more air, water, or land today than when man first began to generate wastes. These reservoirs, moreover, are interconnected. To pollute one may mean to pollute the other two.
>
> What we have done until very recently has been to attack one over-all pollution problem in three sectors. But since we have committed ourselves, as a Nation, to

an all-out attack on pollution of air and water, it will not be very long before there will be left only one repository for wastes. This is the land.

three pollutions

Land Pollution. The most familiar example of community land pollution is the open dump, which is any exposed accumulation of solid wastes. A dump fouls the air, surface and ground water, and the land; it attracts, feeds, and shelters disease-bearing animals and insects. Burning at a dump site compounds the problem. Burning provides a hot meal and a warm home for colonies of rodents and bugs, and transforms solid wastes into air pollution.

A dump is an obvious fire hazard. Incompatible chemical materials unintentionally combined and exposed to the air often produce spontaneous combustion. When this happens, most dump operators do not have the equipment to extinguish the fire nor the ability to confine or control burning to localized areas.

Dumps attract scavengers who do not realize inherent dangers such as disease, fire, and explosions. In Washington, D. C., where citizens' groups were trying to have the Kenilworth dump closed, a boy was burned to death before the dump was finally converted to a sanitary landfill in 1968.

Water Pollution. Dumping in water causes pollution. Liquids may seep through solid wastes on the land and leach into surface or subsurface waters, changing their chemical characteristics. Such liquids from solid wastes can also transport harmful bacteria into creeks, reservoirs, rivers, and community watersheds. When water percolates through accumulated solid wastes and into ground water (water below the surface of the land), it can contaminate well water and spring water used for drinking. Dumping solid wastes into any water course is unhealthy. (See bibliography for more on water pollution.)

Air Pollution. Evidence of solid wastes mismanagement is in the air in many ways, as fly ash, blowing litter, and smoke. The panorama of a city skyline or of a vast industrial river valley and other aspects of the beauty of our land and environment are often obscured by 125 million tons of pollutants dispersed into the atmosphere annually.

The problem is not only one of aerial visibility but also one of cleanliness and health. Eventually particulate matter and dirt-laden gases lodge somewhere: on cars, in homes, in water, or in lungs. The relationship of smoke and other air pollutants to emphysema and bronchial distress is a matter of record. Every person has a right to breathe clean air, but man's ability to breathe and the right to anticipate long life are being infringed upon by the lack of proper solid wastes management. (See bibliography for more on air pollution.)

environmental quality restoration

Effective water management programs are helping to improve the quality of the nation's rivers and streams. Air pollution control programs are beginning the job of cleaning the atmosphere. But improved air and water pollution programs, because of techniques such as outlawing open burning and open dumping, have intensified the solid wastes problem. In addition, pollution from poor solid wastes control by government, industry, commerce, and the individual is a significant threat to the health and well-being of many citizens. Pollution is not, however, an insoluble problem.

An old saying goes, "The best way to finish is to begin," and this is particularly appropriate to solid wastes management.

Good solid wastes management is vital to a clean, healthy environment. Because of increased air and water pollution controls, the problem of how to process our solid wastes safely has become more urgent.

Effective local programs begin with proper storage and frequent collection to help eliminate the temptation to dump solid wastes anywhere. Local governments must also see that solid wastes are processed and disposed of safely. The two major acceptable systems of solid wastes disposal are incineration and sanitary landfill, but both must be designed properly and operated carefully and correctly. In the future recycling methods may be perfected so that these can be considered acceptable processing methods.

Incineration is the process of burning solid, semi-solid, or gaseous combustible wastes to an inoffensive gas and a residue containing little or no combustible material. By definition, *sanitary landfill* requires that on the day solid wastes are deposited, they are compacted to a minimum volume possible and completely covered with at least six inches of compacted earth. A true sanitary landfill presents no problems of vectors, vermin, visual blight, or water pollution. No burning is permitted, and solid wastes are

city-county cooperation

Erie County, Pennsylvania

Erie County is an urban county confronted with growing pains such as water and air pollution and rodent infestation resulting from blight.

Recognizing that action had to be taken by local government to solve these problems, the county and its municipalities joined together in 1966 to survey existing environmental health conditions and recommend alternative solutions. They received demonstration grant support from the Bureau of Solid Waste Management. The relationship of all environmental aspects was evaluated so that a solution to one problem would not contribute to another problem. The federal and state governments provided some assistance for the original study.

The study committee's basic recommendations follow:

1. The city and county should cooperate to provide health and environmental health services.

2. The county should seek assistance to undertake a specific countywide solid wastes disposal study.

3. A public information program should be developed to explain health conditions and create support for a community action program to solve health problems.

4. The appropriate local agencies should provide facilities to be used in implementing the recommendations.

5. A metropolitan water and sewer authority should be established.

6. All city and county planning activities should be coordinated.

One recommendation of the study concerning solid wastes disposal is already well underway: A public information program is bringing the solid wastes problem to the attention of all county residents. Television, radio, and press have been used to help publicize the need for an effective solid wastes disposal program; public officials and interested citizens have appeared before service clubs and organizations such as the PTA. Even the county fair included a display showing films and offering materials on solid wastes. A survey indicated that more than 90 per cent of the persons interviewed now want the county to take action to solve the problem.

By 1968, more than 40 per cent of the original environmental health study's recommendations were in some stage of implementation.

The solid wastes management portion of the study is currently being upgraded to insure that all forms of pollution control will be considered as a solid wastes program is developed. The next step is a detailed preliminary engineering study using the report findings and additional data to recommend alternative disposal methods.

environmental pollution control

Los Angeles County, California

Los Angeles County is an exceptionally large county with over 4,000 square miles and an estimated population of seven million people living in 79 incorporated cities and suburban areas. According to the county engineer, "The people generate approximately 750,000 tons of solid wastes per month. Solid wastes are now placed in sanitary landfills since our air pollution regulations have eliminated incineration of these wastes."

Prior to 1947, more than 150 unregulated open burning dumps existed. Public demand prompted the Board of Supervisors to amend the County Business License Ordinance and the Administrative Code to permit the regulation of disposal site operations within the unincorporated area. By 1957, the county Air Pollution Control District Ordinance prohibited burning household solid wastes in backyard burners, forcing government to establish a means of disposal. In addition, open dumps were outlawed. Nevertheless, some illegal dumping occurs along roadsides. To control this, the county sheriff has assigned the helicopter patrol to keep the areas where dumping has occurred under surveillance until violators are apprehended.

Collection of solid wastes in 20 cities (including the City of Los Angeles) is performed by municipal collection crews. In the remaining 59 cities, city officials award contracts to haulers on a competitive basis or by giving franchises with pre-set fee limitations. The county has responsibility in the unincorporated territories, where solid wastes are collected by private contractors under controls set by the county health department and the county treasurer-tax collector.

Of the 31 disposal sites, 21 are owned privately, five are municipal sites, and five are operated by the county sanitation districts (see Field Report in Guide Number 4, Organization). Some private sites and all sanitation district sites are open to the public and charge a fee for disposal. The municipal sites are not open to the public and generally admit only municipally owned collection trucks.

In the unincorporated territory, solid wastes management is shared among several county agencies that effectively work together:

- THE COMBINED CITY-COUNTY HEALTH DEPARTMENT OF LOS ANGELES *supervises the collection programs of more than 100 private haulers. Failure by any hauler to maintain good service is sufficient cause to cancel his license. With the help of the department, eight garbage disposal service areas have been set up to serve one-third of the dwelling units in the county's unincorporated areas. People within these districts pay for the service on their annual tax bill through an ad valorem tax.*

  The health department, with a force of 200 sanitarians, also checks landfills and transfer stations for basic sanitation, insects, odors, dust, flies, and rodents. To protect public health, the sanitarians can enforce all state laws, county ordinances, and resolutions regulating storage, collection, and ultimate disposal of solid wastes.

- THE REGIONAL PLANNING COMMISSION *exercises control over solid wastes transfer sites and disposal sites by permitting zoning exceptions which set conditions and limitations on the operator or owners of the site according to recommendations submitted by health and other departments. These conditions were formulated to establish conformance with the master plan, and the plans, policies, and programs of the affected community. In general, restrictions are set on the landfill so that other properties are not materially damaged and adequate protection for the public is secured.*

- THE DEPARTMENT OF THE COUNTY ENGINEER *is responsible for the regulation of all privately operated sanitary landfills in the unincorporated area and in cities where the city council requests the county engineer to supervise disposal sites. An industrial waste disposal permit, issued by the county engineer, is necessary to operate any disposal site. To obtain a permit, the site must conform to the specifications of the Los Angeles Regional Water Quality Control Board and the provisions of the Industrial Wastes Disposal Ordinance. The 11 facilities are regularly inspected by industrial waste inspectors to insure compliance with permit conditions and limitations.*

buried promptly. All processes are explained in detail in *Guide Number 5, Design and Operation.*

Canyons, pits, or strip-mined land reclaimed through sanitary landfilling make excellent recreational or light industrial parks. Reclaimed land can also provide permanent green space, and with pre-planning can be contoured to shape a golf course or baseball field. In New York, landfills have been used to help create airport landing fields. Santa Barbara County, California, planned a double solid wastes use for one landfill—initially to contain solid wastes, and when filled to capacity, to be used as the general site for a new transfer station.

A good solid wastes management system must be coordinated with air and water pollution controls so that the environment of the entire area will be improved. Los Angeles County, California, has been in the forefront in solid wastes management for many years with a total pollution abatement program for the entire county. Its program to improve water and air quality made it necessary for the county to improve solid wastes collection and disposal methods so that the control of one pollution would not cause another.

Other counties are planning comprehensive environmental pollution abatement programs. Among them are Erie County, Pennsylvania, and Mecklenburg County, North Carolina (see Field Report in *Guide Number 2, Legal Authority*).

Local governing board members have an obligation to see that solid wastes are managed properly by setting and enforcing standards for good operation of a collection and disposal system. Actual operation of the collection and disposal service may be performed by local governments or by private enterprise operating under franchise or contract to local governments.

what is the areawide approach?

The area to be included in a comprehensive solid wastes management system should encompass the largest feasible geographical area of present and predicted solid wastes generation and include disposal sites for at least 20 years. Frequently the county is the government unit which can best meet these requirements.

Cooperation among neighboring jurisdictions will promote uniform enforcement throughout the area and make it much easier to obtain federal assistance. To develop an areawide program, county government officials should meet with cities within the county and with neighboring jurisdictions to identify similar problems which can be solved jointly.

Advantages of areawide cooperative activity are:

1) elimination of duplication in use of consultants for initial surveys;
2) greater flexibility in locating disposal sites;
3) more easily obtained support of local media—press, radio, and TV;
4) greater discounts for volume orders of collection and disposal equipment;
5) coordination of air and water pollution abatement activities;
6) better chance for federal assistance; and

7) economies of scale in such things as administrative costs, land acquisition, and construction costs.

Local government solid wastes management functions include policy making, public information, and budgeting; planning and review; drafting, adoption, and enforcement of standards; and physical operation of the service. (See *Guide Number 4, Organization* for a detailed discussion.) Many types of organizational structure may be used to perform some or all of the functions of a solid wastes management system. The elected governing body is responsible for assigning functions to one or more of its departments. Officials must work cooperatively with other local governments and the state to assign functions to various jurisdictions (for example, municipal collection and county disposal). Planning the areawide solid wastes management system, deciding how it will operate, and determining who will operate and oversee it are the responsibility of local elected governing board members.

General purpose government must have top priority as the unit to oversee the operation of a solid wastes management system, but the program should be planned areawide. The term *general purpose government* includes counties, cities, and states. General purpose governments can cooperate through interlocal agreements, informal agreements, contracts, transfers of function, or councils

multi-county corporation

Southern West Virginia Regional Health Council

Southern West Virginia is considered one of the most depressed areas of Appalachia. In 1960, per capita annual income for the nearly 400,000 people averaged $1,121. Seventy-six per cent of the people lived in rural non-farm areas in "ribbon communities," lines of homes along a road. Health is poorer than in any other part of Appalachia. The infant mortality rate alone is more than 3.2 per cent, compared to less than 2.2 per cent nationally. Nine counties and 44 municipalities of southern West Virginia, at the initiative of a local physician, united to undertake an intensive study of the region's health problems.

To make the study and to stimulate action for a comprehensive health program, the Southern West Virginia Regional Health Council was incorporated. The organization consists of a "council" of community leaders and local officials in each county, and a "regional council" of representatives from each county's council as well as representatives of several statewide groups. The regional council makes and enforces policy and employs a staff to administer the operation. Each county's council has established standing committees on public health, mental health, training and manpower, dental care, medical services, extended care, communications, and transportation. Identified needs encompass extended care facilities, hospital and clinic staff training, communication and transportation improvements, and wastes management.

The council contracted with the West Virginia Institute of Technology Department of Engineering to study and investigate solid wastes practices in the nine-county area. Three students worked full time for 90 days conducting a door-to-door survey to determine col-

of governments (see appropriate sections in this guide). Subordinate taxing areas within a county are another means to plan and provide service on an areawide basis.

All of these methods ensure that the elected official will be responsible for policy making and comprehensive planning. This way his policy role is not transferred to certain kinds of special purpose governments that are not responsible to the elected representatives of general purpose units of government.

countywide and multi-county programs

A county is an areawide government. It can provide service to both incorporated and unincorporated areas within its boundaries. A county cooperating with other governments, such as a city within the county, facilitates the establishment of efficient collection routes and broadens the area available for the selection of disposal sites. The county offers a stronger base to finance a comprehensive areawide solid wastes management system than do municipalities working independently within a county. (For more information, see *Guide Number 2, Legal Authority*, and *Guide Number 3, Planning*.)

Broome County, New York, is a good example of planning a countywide system to take advantage of economies of scale, broader selection of disposal sites, and a strong financial base.

Several counties can cooperate to form and operate an area-

lection and disposal practices. The survey indicated that most areas had private or municipal collection service but nowhere in the entire nine-county region was any satisfactory disposal system employed. It was obvious that the regional approach to disposal was an immediate need.

Cognizant of the survey findings, geographical barriers, and population densities, but overlooking established political boundaries where necessary, the council identified 12 major solid wastes generating centers. Although these areas contained only 40 per cent of the land area, they encompassed 70 per cent of the region's population. The 12 areas were then grouped into five primary solid wastes generating areas, each to be served by a sanitary landfill, which would immediately provide service to 200,000 people, or 50 per cent of the region's total population.

The basic criteria for selecting the primary areas were:

1) no collector should have to drive more than 10 miles to a sanitary landfill;
2) the cost to each person for disposal should be no greater than $1 per person per year (see following paragraph); and
3) each sanitary landfill should be large enough to accommodate at least 15,000 tons per year.

The project financing is from many sources. Through the Governor's Office and the Health Department the State of West Virginia has contributed a share. One county had a bond issue for $25,000 which may be used to purchase regional disposal sites. Funds are also available under Supplemental Grants-in-Aid for Appalachia for programs which can become self-sufficient in a few years. The initial survey and investigation was financed in part by a Bureau of Solid Waste Management demonstration grant. The regional landfills will be set up so that each city and county using the facility will pay 20 per cent of the operating cost. There will also be a fee per ton collected at the site.

To implement the program, a three-phase action plan has been established: first, set up the five sanitary landfills; second, extend collection service to communities which do not presently receive service and expand disposal service to another 30 per cent of the population by establishing transfer facilities; third, place solid wastes receptacles at strategic locations in remote areas, improve collection procedures and standards, and begin an abandoned automobile removal program. When phase three is implemented, the entire nine-county area will have 100 per cent collection and disposal service.

Communities in Kentucky and Virginia near the West Virginia border will be encouraged to use the areawide disposal sites. When implemented, the Southern West Virginia Regional Health Council program will totally regulate solid wastes collection and disposal. This service will be fully integrated with all other public health programs in the region.

wide system. As part of a comprehensive health program, nine West Virginia counties, with the participation of 44 municipalities, formed the Southern West Virginia Regional Health Council, which plans to operate five sanitary landfills.

councils of governments

Solid wastes problems often cross jurisdictional boundaries, particularly in metropolitan areas. Sometimes a council of governments can help coordinate areawide solid wastes management. For example, the Metropolitan Washington Council of Governments is a voluntary organization composed of local governments in the Washington, D. C., metropolitan area. To gain the authority to develop a comprehensive solid wastes management system, it has proposed the incorporation of a nonprofit Washington Metropolitan Waste Management Agency.

This proposed agency would operate according to prescribed

countywide approach

Broome County, New York

Located in south central New York, Broome County's 734 square miles contain about 222,000 people, who are governed by 25 separate governments. In the past each of these units—16 towns, seven unincorporated villages, and the City of Binghamton—made its own arrangements for the collection and disposal of solid wastes. The result was more than 17 disposal sites, including everything from burning dumps to incinerators and landfills.

In 1966, after preliminary studies and discussion, the Broome County Board of Supervisors decided that a countywide disposal system was necessary to meet the health and economic needs of the community. Accordingly, it proposed an areawide (countywide) system by which the county would assume responsibility for the disposal of all solid wastes and the towns and villages would be responsible for collection of solid wastes within their jurisdictions. Such a multi-jurisdictional areawide approach to solid wastes collection and disposal had never before been attempted by a New York county.

The county then applied to the Bureau of Solid Waste Management for a solid waste disposal demonstration project grant. Broome County, however, did not wait for federal response to its application to move toward countywide disposal. It had already financed a 1965 report on solid wastes disposal prepared by the county Planning Board and the Health Department and in 1966, the county authorized $25,000 to initiate the countywide project. A $42,000 Bureau of Solid Waste Management grant was used to conduct a technical study and an extensive public information program to help stimulate support for and acceptance by all 24 government units of a countywide solid wastes disposal program. (See second Broome County Field Report in Guide Number 8, Citizen Support.)

In addition, county supervisors, the planning director, and the director of environmental health services met with officials from the towns, villages, and City of Binghamton to explain the need for the countywide disposal system. Part 19 of the New York State Sanitary Code, which prohibits open or burning dumps, was emphasized. It was apparent that many of the 24 governmental units could not afford adequate disposal programs of their own. These were the county's arguments for a countywide system. The arguments for sanitary landfill in Broome County were its economic feasibility over incineration and composting, its health advantages over open burning and dumping, and its benefits in land reclamation. Broome County officials plan to begin the disposal system with three landfill sites.

County officials emphasized that they were not proposing a county takeover of collection; each unit of government could continue to contract for private collection or to use municipal collection. County regulation of collection would be the minimum necessary to ensure a good landfill program. Broome County was seeking a cooperative countywide system, not a power grab, and it said so. Most residents and officials were and are willing to accept sanitary landfill, with a provision—"not in my backyard." This attitude has been a continuing problem in Broome County.

The county board views solid wastes disposal as a responsibility it must assume as the only government unit large enough to finance and operate an efficient, continuing program.

bylaws. The agency's proposed statement of principles and policies reads as follows:

> The underlying concept of the Washington Metropolitan Waste Management Agency (hereinafter called "Agency") is to provide a vehicle for the local governments to plan, program, and administer necessary metropolitan wide activities for the treatment, utilization, and disposal of liquid and solid waste in the metropolitan area.
>
> The Agency shall carry out its planning, programming, and operations in a manner which is supplementary to the efforts of the local governments in the treatment, utilization, and disposal of liquid and solid waste. Its activities shall be complementary to, not competitive with, the waste disposal activities of the local governments in the Washington Metropolitan area.
>
> Operational activities of the Agency within the territorial boundaries of any local government within the Washington Metropolitan Area shall be carried on only after the Agency has consulted and obtained approval for such operations from the governing body of the local government.

Councils of governments (COG's) can stimulate local officials to think in broad terms of mutual problem areas, and can encourage jurisdictions to effect a mutually complementary system for solid wastes management. The areawide COG can also develop model legislation and standards for the member bodies to adopt.

special districts and authorities

The term *special district* means an agency of government which operates outside the regular structure of government to perform usually a single function and which relies for financial support primarily on special tax levies. The term *public authority* means an agency of government which operates outside the regular structure of government to perform usually a single function and which relies for financial support primarily on its own issues of revenue bonds, which are to be amortized with interest by user charges. Both of these types of special governments are distinct from the *county-subordinate taxing area*, which is a creation of the county government to provide specific improvements or services within a defined area. It is responsible to the county government and serves a portion rather than all of the county; within that area it usually levies a tax on the assessed value of the property to pay for such improvements or services.

Sometimes special purpose authorities are created to handle new programs because special authorities can be set up to encompass the geographical problem area and to focus on one particular problem. Their creation requires the cooperation of the state and the political entities already existing within the region. To implement a successful program, the special purpose authority must continue to be responsive to local needs and to cooperate with local jurisdictions.

Local government officials should appraise what the impact would be if a special district or public authority were established in their community. Local governments can seldom solve their solid wastes problem by divesting themselves of essential responsibilities and assigning them to autonomous units operating

intra-county action

Lower Passaic Valley Solid Wastes Management Authority, New Jersey

In the Passaic River Valley in the lower half of Passaic County, the four municipalities of Paterson, Clifton, Passaic, and Wayne have a combined population of nearly 350,000, greater than half of the county's total population. In recent years most area solid wastes have been put in landfills in the Jersey lowlands, but these landfills are nearly full and will soon be closed. The notice of the closing of the disposal sites which served the four cities forced each city to find an alternative. The municipal governments decided to discuss together ways of disposing of their wastes (industrial, residential, and commercial) on a cooperative basis.

The mayors of the four cities, serving as an ad hoc committee, developed an action program. With federal funds, the 1960 solid wastes study for the area was updated. The goals the committee identified were (immediate priority) to find a legal pathway to permit the four cities to operate the program together and to develop the most technically efficient, least expensive method of treating and disposing of all solid wastes generated in the region; and (long-range goal) to show that a quad cities' area program could be expanded to serve all urban areas of Passaic County.

To achieve and implement these goals, the cities recommended and the state legislature established in 1968 the Lower Passaic Valley Solid Wastes Management Authority. The authority, established as a taxable unit and given power to issue bonds, has applied for a federal Bureau of Solid Waste Management demonstration grant.

Some basic problems remain. Only one site has been selected and each of the four cities has the right to veto any part of the project, including site locations. However, in anticipation of tax revenues, city opposition is not expected to be great. In fact, in one city, two council members have appeared at public hearings to urge location of the disposal site in their city.

across the boundaries of city and county governments. One county official stated, "Special districts are one additional plateau removed from the electorate and experience dictates that they are less responsible and less resolute on problem solving than directly elected entities." Responsibility for the management of solid wastes is a logical extension of the traditional powers of general purpose government.

In some instances, special purpose governments must be used because of state restrictions or because no other governmental unit is possible. In such cases, the special district is preferable to the public authority because the district embraces a distinct constituency, not merely a group of bondholders almost all of whom live elsewhere. If, however, there is a need to overlap state lines, the public authority is probably the most practicable device. (See *Guide Number 3, Planning*, Tocks Island Field Report, for discussion of an interstate compact.)

If a special district or public authority is used, the overall planning function of the general purpose governments can be protected by having elected county officials within which the area falls serve as the governing body of the new unit of government.

The following is the National Association of Counties policy statement on special districts as presented in *The American County Platform*, Section 1.8:

> The growth of special districts since World War II has been largely in response to the demands of the people for certain types of governmental services. Despite the fact that the special district device has often proved responsive to the needs of the people, its creation has caused numerous problems to counties and other units of general local government. In 1962, the Bureau of the Census reported 18,323 special districts in the United States, an increase of almost 50 per cent over the 1952 figure. Counties are urged to exercise their full powers granted by state law to provide all governmental services desired by their people in order to minimize the resort to special districts.

NACO strongly recommends that special districts and special authorities not be created unless it is totally impossible to work cooperatively through the existing units of general purpose governments—the counties and cities within the area. If special districts or special authorities already exist in the area, rather than create a new special purpose government it would be better to work through an existing district or authority. If the elected governing bodies of existing units of general purpose government decide to create a special authority, they should make the authority directly responsible to themselves. (For more information see bibliography.)

state action

To date, the role of most states in areawide solid wastes management has been limited to planning and technical assistance. No states actually operate a comprehensive statewide system, although state departments of local government, health, highways, and natural resources have been concerned with solid wastes in various ways. State government is the logical unit to evaluate current practices and stimulate local action. Local government should take advantage of the information and assistance available from state agencies.

The following is a list of solid wastes management activities that states are involved in today (however, not all states are doing all of these things):

1) surveying existing practices;
2) determining immediate and long-range needs;
3) setting and enforcing minimum standards and establishing guidelines;
4) coordinating air, land, and water pollution abatement programs and planning activities;
5) providing technical and financial assistance to local government (see *Guide Number 7, Technical and Financial Assistance*);
6) encouraging local jurisdictions to cooperate within the state and in neighboring states;
7) providing a continuing public education program on solid wastes management;
8) providing enabling legislation (see *Guide Number 2, Legal Authority*).

techniques of intergovernmental cooperation

Various types of intergovernmental agreements and contracts are used by cities and counties to establish areawide solid wastes programs. Three frequently used methods are contracting between units of government, joint management, and transfer of function. Even though early discussions between elected officials may be on an informal basis, local governing board members should require that an intergovernmental agreement be written and agreed to by all parties. In this discussion, contract for services refers only to contracts between government units. Contracts between government and private industry are discussed in *Guide Number 2, Legal Authority*, and *Guide Number 4, Organization*.

formal and informal agreements

Governmental agreements can be made on a formal or informal basis. An example of a county's using a formal agreement with another government unit is Klamath County, Oregon, which has a written agreement with the City of Chiloquin, Oregon, to provide collection and disposal of all automobiles abandoned within the city (see Field Report in *Guide Number 5, Design and Operation)*.

Informal agreements are not advisable since they can lead to misunderstanding. In a Midwest community, a county agreed to use a city's landfill and pay the city 20 per cent of the operating costs. The cost was based on the percentage of solid wastes the county contributed to the total amount placed in the disposal site. It is now necessary to purchase a new site. The city wants the county to pay 50 per cent of the acquisition cost of the new site. Since the county did not contribute to the initial site purchase, it is reluctant to contribute now. If the initial agreement had been adequately detailed and written, this disagreement could have been avoided.

contract, joint management, and transfer of function

In *A Handbook for Interlocal Agreements and Contracts*, the Advisory Commission on Intergovernmental Relations states:

> Agreements and contracts are without a doubt the most widely used formal method of cooperation among governments in the United States and present a flexible, yet predictable and enforceable method of adaption among governmental jurisdictions. . . . They can be used to accommodate program needs to desirable service areas without affecting basic structure or organization. Consequently, needed services can be provided and necessary projects undertaken without waiting for long-range govermental reorganization decisions which ultimately may be necessary. The ideal organizational pattern may well be politically unfeasible.

Some or all aspects of a solid wastes management system may be performed jointly. The Southern West Virginia Regional Health Council Field Report is an example of how local governments and community leaders are planning and implementing an areawide solid wastes disposal program.

The use of a contract for service between cities and counties is sometimes referred to as the Lakewood Plan. This method is not in widespread use for solid wastes management, but may help local governments gain economies of scale.

A transfer of function occurs when one level of government is delegated responsibility for a function that another level of government or jurisdiction had. For example, in Broome County, New York, most of the cities and towns have agreed to transfer the function of solid wastes disposal to the county. Due to population expansion in Montgomery County, the Commonwealth of Pennsylvania reclassified it as a third-class county, which made the county responsible for solid wastes management in all parts of the county. A Montgomery County solid wastes disposal system will soon be operational.

transfer of function

Seattle-King County, Washington

In Seattle-King County, Washington, health is one of four functions administered by a consolidated department. In the past, the Seattle Health Department not only set and enforced standards but also operated the Seattle garbage collection and disposal program.

As the economic expansion of the Seattle area required more and better government services, garbage disposal operations for the city were transferred from the health department in the early 1940's to the city engineering department and in 1961 became a garbage utility, a section of the Seattle Engineering Department. In a 1966 report, utility functions were concisely identified:

> *The utility is responsible for the collection and disposal of all garbage from all residential premises and for the disposal of all garbage, rubbish, and trash from whatever source within the city. The utility is financed by monthly garbage collection and disposal charges to residents and disposal charges for all commercial dumping. The capital investment and annual operating costs of the city's long-haul transfer disposal system is financed by these charges.*

The city collects from private residences for $2 per month, a charge billed jointly with water and sewer. Most commercial solid wastes other than garbage is collected by a private scavenger who operated long before the city program was initiated. City solid wastes may be brought to either city transfer station for compaction and disposal. Collection companies are billed by solid wastes tonnage; city residents in private vehicles are admitted free.

About the same time city population began to expand, suburbanization was affecting county development. In 1959, the King County Department of Sanitary Operations assumed the solid wastes disposal function, which had previously been under the health department. The county initiated a program to replace its 11 widely scattered disposal sites and those of several incorporated cities of the county, a few of which were open dumps, with a series of transfer stations (it began with three, now has seven, and plans two more for 1969-70) and one 920-acre disposal site for sanitary landfill with a back-up site of 520 acres for future use. In addition, assisted by a Bureau of Solid Waste Management grant, the county has sponsored the development of new mechanical designs for equipment especially adapted to transfer and sanitary landfill operations.

The county is not involved in solid wastes collection, since collection regulation in unincorporated areas is administered by a state agency, the Washington Utilities and Transportation Commission, which has a regional office in Seattle. Collection routes are established by the awarding of state contracts to private firms.

The Seattle-King County Health Department has expanded environmental health operations and strengthened solid wastes management enforcement. Health officers regularly inspect city, county, and private disposal sites. As part of an aggressive vector and vermin abatement program, all solid wastes producers are now required to store solid wastes in metal containers with tight-fitting lids. In addition, an active air pollution control program is underway to eliminate open burning; the program is well coordinated with the solid wastes control program.

Recently, the Seattle landfills have become inadequate to handle the increasing municipal solid wastes, so King County has agreed to permit landfilling of city solid wastes at the county site until the city's new site is ready for use. City transfer vehicles bring solid wastes from the station to the fill, and county machinery is used to compact and cover the material.

summary

Assistant Surgeon General Richard Prindle in his speech cited earlier summed up the problem of pollution:

> In our one world of pollution, there is one overriding need. This is the need for taking action and making decisions now to insure that there shall be no time of final pollution of the land by solid wastes. The open dump, the haphazardly operated landfill, and the obsolete incinerator must go. And we do not have to postpone their replacement until the scientists and engineers have completed their research and demonstrations of new technology. Landfilling procedures and incineration techniques are available now for the mass reduction of wastes with no or negligible pollution.

Public officials have a direct responsibility to prevent pollution. To do this well, a comprehensive solid wastes management system is necessary. In determining the unit of government best able to plan and administer a solid wastes system, two factors are important: 1) the unit of government administering the system should have authority over the geographical solid wastes production and disposal area; 2) it should have sufficient political power to effect a good program. Frequently, the county is the government unit which can meet these requirements. Where a single county is not large enough to solve the area solid wastes management problem, the multi-county approach may be best. In some large metropolitan areas where solid wastes problems cross jurisdictional boundaries, councils of governments may offer an excellent vehicle to stimulate local officials to think in broad terms of mutual problem areas and to encourage jurisdictions to effect a mutually complementary system for solid wastes management.

Sometimes special purpose governments must be used because of state restrictions or because no other unit of government is possible. In such cases the district is preferred to the public authority because the district embraces a distinct constituency, not merely a group of absentee bondholders. If a special purpose government must be used, it is better to work through existing special purpose governments than to create new ones. Techniques by which jurisdictions can cooperate are contract for service, joint solid wastes management, and transfer of function. Through these techniques, local governments can take advantage of economies of scale to implement an areawide solid wastes management system.

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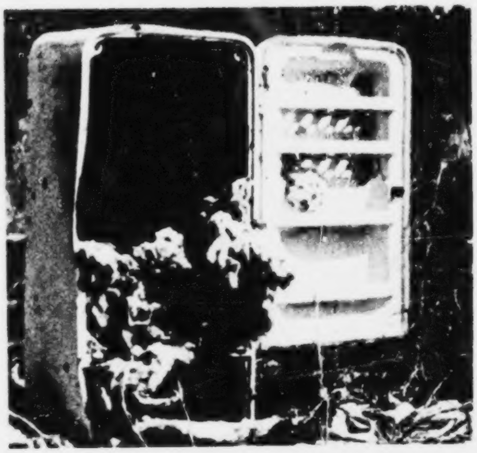
2 legal authority

legal authority



Special regulations are usually needed to control large, bulky items such as the refrigerator stuffed with matting above. The attached door makes this item an even greater hazard for wandering, curious children.

introduction

Because of our nation's prosperity, local governments should be able to expand to meet the public's increasing demand for public service. However, they have not always done so. In areas such as sanitation, much needs to be done. Local and state officials must require that minimum statewide sanitary levels be enforced to protect health. Elected local officials must become increasingly concerned with their community's discarded wastes to prevent air, water, and land pollution.

The need for legal control of all types of pollutants, including solid wastes, is apparent. Legal authority from state legislatures is required to overcome present local and state inadequacies. The director of the Bureau of Solid Waste Management, Richard Vaughan, in a talk to the Fourth Annual Refuse Equipment Show and Congress, 1968, sponsored by the National Solid Wastes Management Association, pointed out:

> Lack of acceptance of solid wastes management as a legitimate community function has hampered progress in many areas. Communities which are jurisdictionally autonomous . . . often do not cooperate or work together for common solutions which are in the best interests of all concerned.

legal authority for state action

Since the passage of the federal Solid Wastes Disposal Act (P.L. 89-272) in October, 1965, most states have begun statewide comprehensive planning for solid wastes management by surveying local disposal practices and developing solid wastes disposal plans (see *Guide Number 3, Planning*).

As of 1968, several states had enacted solid wastes statutes. One major shortcoming of most existing state solid wastes statutes is their fragmentation. Often, aspects of solid wastes management such as storage, collection, transportation, processing, and disposal are treated under various legislative headings. Frequently, authority is delegated to several state regulatory agencies with no clear indication of the responsibility of each agency.

State legislation is needed to correct existing inadequacies and provide authority for the designated state agency or agencies to undertake the following activities:

1) provide for the planning and regulation of solid wastes storage, collection, transportation, processing, and disposal systems;
2) require each political subdivision to submit an areawide

plan for a solid wastes management system for its jurisdictions or in cooperation with other jurisdictions;

3) provide technical and financial assistance to political subdivisions;

4) require its approval before a system can go into operation;

5) impose requirements on political subdivisions;

6) adopt rules, regulations, minimum standards, and procedures (such as prohibition of open burning dumps and open dumps);

7) create a representative advisory committee; and

8) provide remedies and prescribe penalties.

Technical and financial assistance from federal, state, and private sources is discussed in *Guide Number 7. Technical and Financial Assistance.*

broad policy necessary

State enabling legislation should contain a policy statement on solid wastes. For example, the Kentucky Revised Statutes (KRS 211:703) state:

> It is hereby declared to be the policy of this Commonwealth . . . to provide for the disposal of solid wastes in a manner that will protect the public health and welfare, prevent the spread of disease and creation of nuisances, conserve our natural resources, and enhance the beauty and quality of our environment.

State solid wastes enabling legislation should include broad, carefully worded definitions. The definition of "solid wastes" should be broad enough to include garbage, refuse, and other dis-

Only strong regulations can prevent the disposal of demolition materials like those shown above through a raging fire. States are now beginning to enact laws prohibiting all open, burning dumps.

carded solid materials, including solid wastes materials resulting from industrial, commercial, and agricultural operations, and from community activities. The definition should not include solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial wastewater effluents, dissolved materials in irrigation return flows or other common water pollutants.

authorize state planning

Since an essential element of an effective solid wastes program is thorough planning, the legislation should authorize the state agency concerned to develop, prepare, and adopt a state plan for the management of solid wastes. The agency should be authorized to enlist the cooperation of local governments.

The state law should assure proper and effective solid wastes management consistent with the protection of the public health. It should also take into consideration such related factors as population growth, urban and metropolitan development, land use planning, the control of air and water pollution, and the economic and technological advantages of areawide disposal programs. The legislation should be broad enough to permit the use of new methods and technologies, including recycling.

A reasonable time limit should be set by law for the conclusion of the survey and the formation of the state solid wastes management plan. Procedure for adoption of the plan should be provided by statute; the advisability of providing for public hearings as part of this procedure should also be considered. The statute should further provide that upon adoption of the state plan, any disposal of solid wastes not in conformity with the plan is a violation of the law. The act should prohibit open burning of solid wastes and the operation of open dumps. Where these methods are in use, a brief period of transition may be permitted. Adequate sanctions to insure compliance should be provided. In addition, the enforcement agency should be expressly authorized to sue for injunctive relief. The act should confer upon the agency concerned the requisite administrative powers, including the right of inspection.

set minimum statewide standards

The legislation which authorizes a statewide solid wastes management program should specifically designate an agency to be responsible for the administration of the program. The legislature should direct the state agency to establish minimum statewide standards and require local authorities to adopt the same or more stringent standards, consistent with the state plan. Definite minimum statewide standards will tend to lessen conflicts between local jurisdictions.

In 1965, Illinois passed a state solid wastes law (Ill. Revised Statutes, 1967, Chap. 111.5, Sec. 471-476) requiring registration and regulation of all disposal sites; this act is also applicable to all local governments and private enterprises, and establishes minimum standards for the location, design, construction, operation, and maintenance of solid wastes disposal sites. If any person, as defined by this law, fails to comply or violates state minimum solid wastes regulations, the state attorney general can seek injunctive relief against the offending party.

The legislature may want to authorize solid wastes management disposal districts, or the use of existing districts. The areawide approach to solving the solid wastes problems of rural and urban areas requires cooperation among cities, counties, and states. Therefore, these units of general purpose government should be authorized to enter into agreements and contracts with other government subdivisions, whether within or outside of the state, for the joint management of solid wastes.

Legislation should provide that every intergovernmental agreement for solid wastes management be submitted to the state

an interlocal agreement

Maryville, Alcoa, and Blount County, Tennessee

Through its Interlocal Cooperation Act, Tennessee permits local government units to enter into interlocal agreements and contracts to provide services and facilities more efficiently (Tennessee Code Annotated, 12-801 through 19-809). In July, 1951, the City of Maryville and Blount County entered an agreement to operate jointly a sanitary landfill. The agreement took place because a county study pointed out the great need for a sanitary disposal area. In September, 1962, the City of Alcoa joined this cooperative landfill agreement. Blount County, part of the Knoxville metropolitan area, provides disposal service to about 42,000 residents.

The 1962 three-party agreement, which with minor modifications has been continued yearly, may be terminated by any of the parties upon six months' written notice. (See Advisory Commission on Intergovernmental Relations, Interlocal Agreements and Contracts, 1967, pp. 166-168, for the complete text of the 1962 legal agreement.)

The joint program operates as follows:

- *Maryville is in charge of the operation of the cooperative landfill site (under the director of public works), furnishing all personnel, supervision, and other arrangements to conduct the disposal project.*
- *Operational expenses are divided among the three parties on a 40-30-30 per cent basis (the county pays the larger percentage). Maryville pays all salaries and wages and makes landfill site improvements, billing the other two jurisdictions for their portion monthly.*
- *Operating through its highway department, the county builds and constructs necessary access roads to the disposal site.*
- *None of the parties is obligated to collect the garbage of residents living outside the corporate limits of the two cities, but these citizens or their agents may bring garbage to the site during normal working hours (no dump fees are charged private citizens or local contractors).*
- *Parties of the agreement are jointly responsible for the selection of any new landfill sites.*

Maryville's public works director, the city manager of Alcoa, and the county judge were asked to cite advantages of the cooperative arrangement as it presently operates. Some of the more important of those named are summarized as follows:

1. Financial. Such a joint endeavor is much more economical than three separately operated landfills. Excluding original capital outlay, it is estimated that individual operations would cost each government at least one-third more. This advantage can be greatly enhanced if a convenient site, within reasonable traveling distance from areas being served, can be located and/or donated by one of the parties to the agreement.

2. Administrative. Operation of a single landfill relieves three jurisdictions of supervision (and its commensurate problems, headaches, and complaints) that one governmental body can handle. Control should be centralized in the hands of one person, as it is with the Maryville public works director, to insure responsibility and prevent unpleasant disagreements and interference.

3. Expanded Service. It enables some government jurisdictions within a community to provide solid wastes disposal services which they might not otherwise be able to provide.

4. Promotion of Cooperation. This joint undertaking has brought municipal and county officials together, prompting them to think, discuss, and work together toward solution of a multitude of governmental and service problems. For example, Maryville and Alcoa are now seriously considering elimination of their planning commission and combining their efforts with the county through a county planning commission.

This pleasant, shaded field has been destroyed by a sprawling mass of abandoned junked autos. Their disposal is a special problem, often requiring state legislation to enable their control.

agency for approval, conditioned upon the agency's determining that such agreement conforms to the state plan.

The legislature may want to establish a branch within the state agency to conduct research, demonstrate new processes, help solve specific problems, and assist local governments. It should also consider authorizing state financial aid to local governments for capital investment in, and partial operating expenses of, local solid wastes programs.

Additional areas in which the legislature may want to act include instituting a permit system for control of waste processing sites, and requiring community developers to establish satisfactory arrangements for the management of solid wastes.

Where extensive solid wastes legislation has not been enacted and is not being considered, it may be necessary, as a first step, to enact a limited measure requiring a specific state agency to conduct a comprehensive statewide study or survey of solid wastes problems and practices. The findings of such a study or survey could later provide the basis for a more comprehensive state law. (For an example of a comprehensive state solid wastes management law, see Pennsylvania Solid Waste Management Act, Appendix A.)

legal authority for local action

The legal basis for local governments to control solid wastes is state enabling law. Without this enabling authority, local governments cannot acquire land, develop facilities, or spend public funds to regulate and control solid wastes. In some states, local governments are permitted to exercise their general police power to protect public health by regulating storage, collection, and disposal of solid wastes. To insure that local governments have the necessary power to control solid wastes, state legislatures should pass broad enabling legislation to allow all political subdivisions to manage solid wastes in coordination with other environmental protection programs.

State laws authorizing the organization of areawide solid wastes management systems should be permissive, not mandatory. Local governments should have the legal authority to:

1) establish an areawide solid wastes management system;
2) adopt requirements concerning storage, transportation, processing and disposal of solid wastes, including abandoned automobiles, industrial and agricultural solid wastes;
3) establish a separate department, if necessary, to regulate and/or operate solid wastes management systems;
4) contract with counties, municipal corporations, individuals, or private corporations; grant franchises for collection and disposal services;
5) acquire land, by eminent domain if necessary, for solid wastes facilities;
6) abate nuisances caused by the improper handling of solid wastes;
7) finance a solid wastes management system by:
    - collecting taxes and special charges
    - issuing general obligation and revenue bonds
    - refunding bonds for lower interest rates
    - issuing liens against property for delinquent taxes or charges
    - increasing or eliminating debt limitations for incinerators, sanitary landfills, transfer stations, and compost plant bonds
    - exempting from debt limit, revenue bonds secured by service charges
    - accepting grants-in-aid
    - licensing private solid wastes operators and using the license fees to offset the cost of operating a disposal system
    - collecting service charges against tax exempt property
    - establishing a county subordinate tax area as an alternative to a special district or a public authority.

Chemung County, New York, under the New York State County Law, established a county refuse agency involving a cooperative approach among cities and the county.

If counties have the necessary authority to operate a solid wastes system, then the county governing body should act to require that the county engineer, public works department, or other department, manage the collection and disposal of solid wastes. (For more information, see *Guide Number 4, Organization.*)

Local regulation must extend to collection, whether public or private, and even to the containers homeowners use to set out solid wastes. The cans shown here make collection more costly, difficult, and hazardous to collectors. And they hardly add to the beautification of the community.

charters

By early 1968, approximately 36 counties in the United States were operating under home rule charters, but all home rule counties and cities do not have the authority needed to operate a solid wastes management system. In some cases, charters of home rule jurisdictions do not mention whether or not the jurisdiction may enact local laws to regulate and operate solid wastes systems. All local governments, including those operating under a charter, should be permitted to manage solid wastes.

Charter counties in Maryland are expressly authorized by the Annotated Code of Maryland, 1957 [Art. 25A, Sec. 5(T)] to enact local laws relating to solid wastes:

> To enact local laws enabling the county council to adopt from time to time, after reasonable notice and opportunity for public hearing and/or without modifications,

using existing legal authority for planning

Chemung County, New York

Chemung County is located on the New York-Pennsylvania state border. In 1968, its population was approximately 105,000, the majority located in the Elmira urban area.

In April, 1966, the Board of Supervisors passed a resolution establishing a Chemung County Refuse Agency pursuant to Article 5A, Section 252 of the New York State County Law, which reads:

> *The agency as empowered by the Board of Supervisors may assemble data relating to the problems of the collection and disposal of garbage, ashes, rubbish and other waste made within the county and the elimination or alleviation of such problems and the possibility of developing and utilizing existing facilities to make them available to the several municipalities and other political subdivisions within the county.*

The nine citizen members of the refuse agency are appointed by the Board of Supervisors upon recommendation of its chairman.

In 1967, the refuse agency purchased 200 acres of potentially useful land for a sanitary landfill through the county's 1967 Capital Project and received $100,000 from this account in 1968. In March, 1968, the agency earmarked $10,000 for initial legal and engineering surveys. The legal survey was made to determine whether the existing refuse agency could become operational. If the refuse agency becomes operational, it is expected to be similar to the present part-county sewer district, which is part of the county government.

During 1968, the refuse agency worked to establish an effective relationship with the ten-member Chemung County Council of Governments. Both groups have recommended the areawide approach to solid wastes management.

> ordinances and amendments thereof for the protection and promotion of public safety, health, morals, comfort and welfare, related to any of the following: . . . the disposal of wastes. . . .

Home rule charters have assigned solid wastes functions to the following departments: health, public works, county engineer, or a separate solid wastes department. For example, the charter of the Metropolitan Government of Nashville and Davidson County, Tennessee [Art. 8, Chap. 4, Sec. 2(b)], gives the Department of Public Works responsibility for "the collection and disposal of garbage and other refuse, and maintenance and operation of facilities for the disposal of same." Collection and disposal are conducted within an "urban service district" where services are financed at a higher tax rate than in the "general service district." For further information, see *Guide Number 1, Areawide Approaches* and the Field Report in *Guide Number 4, Organization.*

ordinances

In many instances, ordinances have been adopted by local governments under state nuisance or air and water pollution control laws, which are indirectly concerned with solid wastes disposal. Such limited state enabling authority is generally inadequate for local government solid wastes management programs. Moreover, local governments can perform only those functions assigned to them by state enabling legislation, and by long tradition, state courts tend to interpret local powers narrowly. Local officials must acquire specific authority from their state legislatures to enact local ordinances, resolutions, rules, and regulations relating to the management of solid wastes.

Most local "solid wastes" or refuse ordinances are similar to state laws; that is, they are fragmented and negative, lacking in proper definitions of solid wastes. Far too many ordinances define each type of solid wastes instead of providing an overall definition. An ordinance definition of solid wastes should be similar to the one used at the beginning of Guide Number 1.

The ordinance should be conceptual in scope and direct the assigned local agency to work with the state agency in preparing local procedures, rules, and regulations relating to the storage, collection, transportation, processing, recycling, and disposal of solid wastes. It should also prohibit open dumps and open burning and assign a local agency the responsibility of establishing rules and regulations. Far too many local ordinances are actually specific rules and regulations relating to one aspect of solid wastes management. Writing specifics into solid wastes ordinances is not encouraged because the technology of handling solid wastes is rapidly changing and methods enshrined in ordinances may soon become obsolete and prove costly in light of newer methods that could be implemented. Rules, regulations, and procedures adopted by a responsible local agency can be changed more quickly than can local ordinances.

In short, ordinances should be conceptual in purpose, flexible in methods, positive in direction, and prohibitive of any type of air, water, or land pollution. In drafting a comprehensive solid wastes ordinance, the local attorney should work with the state solid wastes agency. A suggested outline of a comprehensive solid wastes ordinance is given in Appendix B.

Standards, Rules, and Regulations. The ordinance must direct the local department to incorporate the minimum state standards but it should allow more stringent standards if these are more appropriate to solve local problems. Rules and regulations are generally drawn up by the local agency assigned to carry out the intent of the local ordinance.

All the elements pertaining to solid wastes management, such as storage, collection, transportation, processing, recycling, reclamation, and final disposal should be covered by rules and regulations. For example, solid wastes should be stored in closed containers, but different container standards can be established for residential, commercial, industrial, and agricultural areas. This could mean that the homeowner's "garbage can" should be a 30-gallon, tapered container with two handles and a tight cover; regulations should prohibit the unmanageable 55-gallon barrel drum.

Backed by a comprehensive solid wastes management ordinance, the responsible local department should issue licenses and permits to regulate private solid wastes operators in the interests of the community. County health departments which issue permits when regulations are met, can also revoke the permit if these regulations are violated. The Los Angeles County engineer and the county health officer will revoke any permit covering a private

Local rules and regulations must extend to private collection vehicles like the one shown above. Otherwise, open pickups or other inadequate vehicles may litter the county's roads.

Special collection and disposal arrangements need to be made for chemical and other noxious wastes. The crude chemical wastes being spread over other solid wastes here could cause fire, explosion, or gases when united with them.

disposal site or collection vehicle if the site or collection truck is not operated according to regulations established by either department.

Regulations should restrict various undesirable practices. Citizens should be required to remove accumulated rubble, waste, and junk autos from their property. As an example, a Los Angeles County Health Department sanitarian can get a court order to compel a recalcitrant homeowner to clean up his property, or the county will do it and send the owner a bill.

Scavenging should be restricted to prevent interference with collection and disposal operations. Generally, individual scavenging tends to slow the overall operation of the system.

The feeding of garbage to hogs must be carefully controlled. Most commercial and residential garbage that is fed to swine is not adequately cooked; therefore, there is danger of transmitting trichinosis to man.

Motor vehicle junkyards must also be regulated and legitimate ways of disposing of motor vehicles established. One of the greatest impediments to abandoned automobile disposal is the legal requirement that title be obtained. This problem can be alleviated by shortening the time period needed for a title search. (See Guide

legal control in unincorporated areas

Mecklenburg County, North Carolina

In 1958, the Mecklenburg County, N. C., Health Department passed regulations governing the storage, collection, transportation, and disposal of "garbage and refuse" under authority granted by Section 17, Chapter 130 of the General Statutes of North Carolina. These regulations, applicable only to unincorporated areas of the county, cover four major subjects: (1) the type of containers in which garbage should be placed; (2) sanitation standards for equipment used in the collection of garbage and other solid wastes; (3) standards and methods for disposal; and (4) requirements relating to the licensing of collectors. However, the regulations do not prohibit open dumps or allow the health department to operate any part of a solid wastes management system.

In 1965, the health department completed a report on countywide environmental pollution (air, water, and land). The report indicated there were over 167 open dumps which served as breeding places for disease-transmitting flies, mosquitoes, cockroaches, and rats. It cited the county's phenomenal population growth and predicted that by 1980 520,000 people would be discarding some 427,000 tons of solid wastes annually. To anticipate future needs, the report proposed a seven-point program, the highlights of which urged the county to establish a minimum of four sanitary landfills, located outside the City of Charlotte, and to discourage burning of solid wastes on residential premises and in open dumps.

Nevertheless, little action was taken on environmental pollution control until 1967, when the health department adopted regulations providing for air pollution control on a countywide basis. At this time, open burning of leaves, garbage, construction wastes, and other debris was prohibited. This

Number 7, Technical and Financial Assistance for sources of information on abandoned motor vehicles.)

Regulations should establish separate guidelines for disposal of dangerous wastes such as hospital wastes, which may contain pathogens, and noxious chemical wastes.

Control of litter and illicit roadside dumping are both a public and an individual responsibility. Conveniently placed public waste containers should be provided. Penalties and fines for littering and roadside dumping should be high enough to recover collection costs.

Enforcement. Adoption of ordinances, rules, regulations, and standards is only the first step in controlling solid wastes. Program effectiveness depends on strong enforcement, including public education. If the state has adopted minimum solid wastes management standards, the local government can often receive state support for local enforcement.

When the City of Hamilton, Ohio, passed an ordinance requiring residents to store all solid wastes in covered cans, and directed the public works department to stop picking up cardboard boxes and other unsuitable containers, thousands of individual complaints swamped the city because boxes were not collected.

This Charleston, N. C., litterbug was sentenced to pick up papers while wearing the sign shown instead of merely being assessed a token fine.

I WAS
A
Litterbug

action pointed up the need for proper solid wastes management.

In May, 1967, the Charlotte Chamber of Commerce Environmental Health Committee issued a report on the status of environmental pollution throughout the county. The chamber noted that the problem of solid wastes disposal had not been resolved in any way and that if anything, due to population increase, the problem had become worse. This report largely supplemented previous studies, but in addition examined three aspects of sanitary landfills: (1) need, (2) suggested plan of operation, and (3) estimated initial cost. The report emphasized that since 1961 Mecklenburg County, as well as other specified counties, had had the legal authority to establish and operate a solid wastes collection and disposal system under Section 273, Article 22, Chapter 153 of the General Statutes of North Carolina. Under this statute, Mecklenburg County may (1) establish and operate collection services; (2) establish and operate disposal services; (3) contract with any city or town to collect or dispose of garbage; and (4) charge fees for the use of disposal facilities.

Because of available enabling legislation and a public demand for action, the Mecklenburg County Board of Commissioners allocated $100,000 for fiscal year 1968, for the Department of Public Works and Utilities to establish a division to operate sanitary landfills. By February, 1968, 49 acres and equipment had been purchased for a sanitary landfill serving three communities in the northern part of the county. The department continued looking for three more landfill sites.

Mecklenburg County plans to consider joint city-county sanitary landfill operations on an areawide basis with adjacent counties, including nearby counties in South Carolina.

In every case, public works department procedure was to send a man to the complaining person to explain the reasons for the new ordinance. Then he would pick up the box that had been left, carefully pointing out that this was the last time the city would do so. After three months, complaints subsided and the new operation proceeded smoothly. To provide adequate manpower to visit each complainant, the city (population 80,000) assigned three individuals, one taken off his regular job as part of a collection crew.

The City of Beaufort and Beaufort County, South Carolina, work together to enforce storage regulations (established by city ordinance) and to educate citizens. When collectors find an un-

ordinance enforcement

Santa Barbara County, California

Santa Barbara County (population 260,000), California, located 80 miles northwest of Los Angeles, is bounded on one side by Pacific beaches and on the other by mountain foothills and arid land. The county has a comprehensive solid wastes management ordinance, which is effectively enforced.

The ordinance was adopted by the Board of Supervisors in July, 1960, as an "emergency ordinance to protect the public health, safety and welfare." Therefore, no public hearings were required before passage. It superseded an ordinance passed five months earlier which dealt primarily with the fees and operations of county-run disposal areas. The county operates transfer and disposal sites and regulates private collection.

The ordinance provides that all private property owners must maintain litter-free premises. If a Refuse Department notice to remove solid wastes is not complied with within five days, the department can order and pay for county removal and disposal of the solid wastes. The cost of this operation, plus 7 per cent accrued interest per annum, is charged against the property owner. (Farm or ranch owners may bury solid wastes on their land.)

Provisions require any haulers to obtain a permit to operate in unincorporated areas. Permit fees are based upon the number of trucks to be used by the applicant and permits are issued for a five-year period.

Operators must mark each collection truck with a registration number, clean and disinfect each truck daily, keep whatever records the Refuse Department requires, and collect refuse only within the territory assigned them by the department. To provide funds for the administration and enforcement of the ordinance, 2 per cent of each collector's gross receipts must be paid to the county each month. Late payments mean a 10 per cent penalty.

Another protective provision in the ordinance authorizes the county to take temporary possession of all facilities and equipment of a collector in the event of a labor dispute which interrupts service for more than 72 hours. The collector's employees then become temporary county employees. Gross revenue collected during such a period, less costs and expenses, remains with the county.

Violation of any provision of the 55-section ordinance is a misdemeanor punishable by a maximum $500 fine, six months imprisonment, or both.

The ordinance and its implementing regulations are strongly enforced. One advantage to the county is that any enforcement officer can issue a court citation for violation of the ordinance, just as a police officer issues a traffic citation.

In one 30-day period early in 1968, 24 arrests were made, mostly for dumping on vacant lots and in streambeds and for road spillage. One enforcement officer patrols county roads and makes inspections resulting from complaints by collectors, citizens, or other public agencies. The rule for these inspections is friendly persuasion based on the ordinance, followed by warnings and finally court action. The Refuse Department cooperates closely with fire inspectors on complaints concerning individual burning of refuse.

The director of the Refuse Department says that the antiscavenging provision is difficult to enforce because of the extra manpower it would require. Although the transfer station is fenced and county personnel are on duty every day, individual residents who come to deposit refuse at the transfer station cannot be easily prevented from picking up items that attract them.

satisfactory container in use, a red adhesive sticker is attached, reading "This container is condemned for use of garbage and refuse by authority of the Beaufort County Health Department." Names and addresses of households and businesses so warned are submitted to the city manager, who sends a notice to the violating parties that they must provide a satisfactory container. In case of noncompliance, the notice is followed by a personal visit from the county sanitarian to stress the need for adequate solid wastes storage.

land acquisition

Zoning. Elected officials can minimize the problem of selecting wastes processing sites by planning and zoning for such sites. Planning and zoning enable local governments to set aside land to be used for processing sites. In zoning ordinances officials can require that processing sites be located where they will not be detrimental to air, water, or land resources.

For example, the Los Angeles County Regional Planning Commission will support proposed sanitary landfill sites only if certain conditions in the county zoning ordinance are met:

> Premises in Zone R-A may be used for land reclamation *projects* [sanitary landfills] if all provisions . . . are complied with and that: (a) topographical conditions are such that the completion of the operations will be of substantial benefit to the property and to the community in which such is located, and (b) there exists a need for such facilities, the County Engineer so finds, and files with the Commission a statement in writing that he so finds, and (c) such use will not be materially detrimental to the public welfare nor to the property of other persons located in the vicinity thereof.

Eminent Domain. The power of eminent domain should be employed only when all other methods of acquiring solid wastes processing sites have been exhausted. This technique should not be exercised too frequently since it can cause negative public reaction and possibly end any progress towards satisfactory acquisition of alternate disposal sites. It is suggested that local officials plan for future disposal sites and acquire the land through purchase or leasing.

Leasing. Leasing private land is an alternative method for obtaining disposal or processing sites. Some counties on the West Coast have been able to lease "marginal property" from private owners and reclaim such land for golf courses and other beneficial uses.

regulation of private operators

If there is participation from the private sector in a solid wastes management system, some form of direct legal control over private operators is necessary. This is best done by contract or the franchise device. The difference between a contract and a franchise is mainly one of degree. A contract is a legally binding agreement with a company for performance of a designated service. It does not deny other companies the right to operate independently in the same area. A franchise is a legal agreement with one company giving it *exclusive right* to provide service in a certain area. In return for the grant of monopoly, government is in a better position to demand exceptionally high operating and service standards, delineated in the franchise agreement.

Franchises and contracts differ in the manner of financing. Generally, in franchises the private operator collects charges from the customer, while in contracts payment is provided by the local government. A franchise is awarded to the highest bidder, whereas contracts are awarded to the lowest qualified bidder. (For further information on financing, see *Guide Number 6.*) The federal Bureau of Solid Waste Management, in cooperation with the National Solid Wastes Management Association, a trade association representing solid wastes operators, has developed a model contract for local officials for sanitary landfill operation (see bibliography).

other legal aspects

Other legal aspects of solid wastes management must be considered by local government officials.

Design and construction contracts must contain "guarantee of performance" clauses. The elected governing body should require its local attorney to see that all contracts include a separate clause expressing a guarantee of performance for a specific period of time.

Liability insurance is needed to protect public employees and the community in case of accidents resulting from solid wastes handling operations. In 1967, a small child drowned in a pond of garbage mistaken for solid gound in a Florida county's unfenced dump. In cases of this type, a court could find a local government responsible under the attractive nuisance doctrine for the injury or death of a person resulting from unsafe solid wastes management operations.

Liability insurance and knowledge of liability laws are necessary to local governments involved in solid wastes control activities. Both employees and residents can be injured by poor collection, storage, and disposal. The "tote" barrel above places a great burden on the collector and could injure him.

summary

In most states comprehensive state legislation is urgently needed as an initial step to permit establishment of solid wastes management systems. This legislation must permit state and local action. State legislation must be broad and conceptual in scope and allow rules, regulations, and minimum statewide standards to be drawn up and enforced by the responsible state agency.

The legal basis for local governments to control solid wastes is state enabling law. Without this enabling authority, local governments cannot acquire land, develop facilities, or spend public funds to regulate and control solid wastes. To insure that local governments have the necessary powers, legislation should allow political subdivisions to manage wastes in coordination with other environmental protection programs.

Home rule cities and counties should examine their charters closely to be sure they have the authority to plan, regulate, and operate a solid wastes management system. Local officials should enact a comprehensive ordinance governing the management of solid wastes. Ordinances should not be encumbered with technical details which are likely to be out of date in a short time. Ordinances should be conceptual in scope flexible in methods, positive in direction, and prohibitive of any type of air, water, or land pollution.

The ordinance should designate a local agency or agencies to adopt and enforce standards, rules, and regulations; to plan; and, if necessary, to operate a system. The effectiveness of the program will depend on strong enforcement and effective public education.

solving legal problems

Montgomery County, Ohio

Thirteen years ago officials in Montgomery County (population 527,000), Ohio, decided that incineration was the answer to their solid wastes disposal problem. However, there were legal obstacles to the establishment of a solid wastes management system for the county and the seven municipalities within its boundaries. In 1956, the county governing body established a solid wastes disposal district under authority of Section 343.01 of the Ohio Revised Code, which states, "Any board of county commissioners may, by resolution, lay out, establish, and maintain one or more garbage and refuse disposal districts within its respective county, outside of municipal corporations. . . ." Since the district could not include the incorporated cities, this enabling legislation was not sufficient for the county, which has incorporated municipalities, including Dayton, within its boundaries. To make the incinerator project economically feasible, the entire county had to cooperate. Since the cities could not be included in the district, the county attempted to overcome this difficulty by contracting with the municipalities "whereby each municipality agrees to deliver or require its licensed haulers to deliver to the incinerator plants all of its disposable waste. . . ."

In 1965, the Ohio Code was revised to allow for county-wide collection and disposal districts including municipalities. The code now states, "The boundaries of any such district may include the entire county, may be revised from time to time, and may include a part or all of the territory within a municipal corporation when authorized by ordinance of the legislative authority of such municipal corporation. . . ."

With jurisdiction and customers thus assured, the county sought to build the incinerators and put an end to the use of dumps. When the incinerators in Montgomery County begin operating, they will be the only accredited disposal sites within the county. The financing of the twin incinerators, scheduled to begin operating in 1969, is authorized under Section 133.06 of the Ohio Revised Code. In October, 1967, $10.4 million in revenue bonds and notes were delivered to purchasers and construction was ready to begin.

Local governments should also be allowed to undertake the following activities:

- Planning and zoning for wastes processing sites and acquisition of sites through purchase, eminent domain, or leasing of private property.
- Regulation of private solid wastes operators through the issuance of permits and licenses, and the use of franchises or contracts.

Elected officials should not overlook other important legal aspects of a solid wastes management system, such as the need for liability protection and "guarantee of performance" clauses in all design and construction contracts.

Broad state enabling legislation is essential to permit and encourage local governments to establish comprehensive solid wastes management systems.

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appendix a: pennsylvania state enabling legislation

Act 241, Pennsylvania Solid Waste Management Act

Providing for the planning and regulation of solid waste storage, collection, transportation, processing and disposal systems; requiring municipalities to submit plans for solid waste management systems in their jurisdiction; authorizing grants to municipalities; requiring permits for operating processing or disposal systems; imposing duties on and granting powers to municipalities; authorizing the Department of Health to adopt rules, regulations, standards and procedures; creating an advisory committee; providing remedies, prescribing penalties, and making an appropriation.

The General Assembly of the Commonwealth of Pennsylvania hereby enacts as follows:

Section 1. Short Title.—This act shall be known and may be Cited as the "Pennsylvania Solid Waste Management Act."

Section 2. Legislative finding; declaration of policy.—It is hereby determined and declared as a matter of legislative finding that, since improper and inadequate solid waste practices create public health hazards, environmental pollution and economic loss, it is the purpose of this act to:

(1) Establish and maintain a cooperative state and local program of planning and technical and financial assistance for comprehensive solid waste management;

(2) Utilize, wherever feasible and desirable, the capabilities of private enterprise in accomplishing the desired objectives of an effective solid waste management program; and

(3) Require permits for the operation of processing and disposal systems.

Section 3. Definitions.—The following words and phrases shall have the meaning ascribed to them in this section unless the context clearly indicates otherwise:

(1) "Department" means the Department of Health of the Commonwealth of Pennsylvania and its authorized representatives.

(2) "Secretary" means the

Secretary of Health of the Commonwealth of Pennsylvania.

(3) "Solid waste" means garbage, refuse and other discarded materials including, but not limited to, solid and liquid waste materials resulting from industrial, commercial, agriculture and residential activities.

(4) "Solid waste management system" means the entire process of storage, collection, transportation, processing and disposal of solid wastes by any person engaging in such process as a business or any municipality, authority, county or any combination thereof.

(5) "Municipality" means a city, incorporated town, township and borough.

(6) "Person" means individual, partnership, corporation, association, institution, cooperative enterprise, or legal entity.

Section 4. Advisory Committee.—(a) An Advisory Committee consisting of twenty-two members shall be appointed by the governor, membership of which shall include one representative of the Department of Agriculture, Department of Commerce, Department of Community Affairs, State Planning Board, Pennsylvania State Association of Township Supervisors, Pennsylvania State Association of Township Commissioners, Pennsylvania State Association of Boroughs, Pennsylvania League of Cities, Pennsylvania Association of County Commissioners, Pennsylvania Municipal Authorities Association, Pennsylvania State University, Drexel Institute of Technology, Pennsylvania State Grange, Pennsylvania Farmers' Association, Pennsylvania Home Builders' Association, Pennsylvania Canners and Food Processors Association and Pennsylvania Society of Professional Engineers.

(b) The Advisory Committee may recommend to the secretary the adoption, amendment or repeal of such rules, regulations, standards and procedures as it deems necessary and advisable for the implementation of the act.

(c) The members of the committee shall not receive any compensation for their services but shall be reimbursed for their actual and necessary expenses incurred in the performance of their duties.

Section 5. Submission of Plans.—(a) Each municipality with a population density of three hundred or more inhabitants per square mile shall submit to the department an officially adopted plan for a solid waste management system or systems serving areas within its jurisdiction within two years of the effective date of this section, and shall, from time to time, submit such revisions of said plan as it deems necessary or as the department may require.

(b) When more than one municipality has authority over an existing or proposed solid waste management system or systems, or any part thereof, the required plan or any revision thereof may be submitted jointly by the municipalities concerned or by an authority or county or by one or more of the municipalities with the concurrence of the others.

(c) Every plan, and any revision thereof shall delineate areas where solid waste management systems are in existence and areas where the solid waste management systems are planned to be available within a ten-year period.

(d) Every plan shall:

(1) Provide for the orderly extension of solid waste management systems in a manner consistent with the needs and plans of the whole area, and in a manner which will not create pollution of the waters or air of the Commonwealth, nor constitute a public nuisance and shall otherwise provide for the safe and sanitary disposal of solid waste;

(2) Take into consideration all aspects of planning, zoning, population estimates, engineering and economics so as to delineate with all practicable precision those portions of the area which may reasonably be expected to be served by a solid waste management system within the next ten years as well as those areas where it is not reasonably foreseeable that a solid waste management system will be needed after ten years;

(3) Take into consideration any existing plan affecting the development, use and protection of air, water or land resources;

(4) Set forth a time schedule and proposed methods of financing the development, construction and operation of the planned solid waste management systems, together with the estimated cost thereof;

(5) Include a provision for periodic revision of the plan;

(6) Include such other information as the department shall require.

(e) The plan shall be reviewed by appropriate official planning agencies within a municipality including a planning agency with area-wide jurisdiction, if one exists, and the county planning commission, for consistency with programs of planning for the area, and all such reviews shall be transmitted to the department with the proposed plan.

(f) The department is hereby authorized to approve or disapprove plans for solid waste management systems submitted in accordance with this act. Any plan which has not been disapproved within one year of the date of its submission shall be deemed an approved plan. In case any plan is disapproved, a hearing shall be held thereon before the department within fifteen days after request therefore is made by the municipality, municipalities, county or authority whose plan is disapproved. Within seven days following the date of such hearing, the department shall notify all parties in writing of the determination of said hearing and the reasons therefor. Any party aggrieved by this determination shall have the right of appeal in accordance with the provisions of the act of June 4, 1945 (P.L. 1388), known as the "Administrative Agency Law."

(g) The department is authorized to provide technical assistance to counties, municipalities and authorities in coordinating plans for solid waste management systems required by this act, including revisions of such plans.

(h) The department may establish priorities for the time within which plans shall be submitted and may, in appropriate cases, recommend the submission of joint plans.

(i) The department may institute an action in mandamus in the court of common pleas of the county in which the municipality is located to compel municipalities to submit plans in accordance with this act and the rules, regulations and procedures of the department.

Section 6. Powers and Duties of the Department.—The department shall have the power and its duty shall be to:

(1) Administer the solid waste management program pursuant to the provisions of this act.

(2) Cooperate with appropriate private organizations in carrying out its duties under this act.

(3) Adopt such rules, regulations, standards and procedures as shall be necessary to conserve the air, water and land resources of the Commonwealth, protect the public health, prevent public nuisances, and enable it to carry out the purposes and provisions of this act.

(4) Develop a State-wide solid waste management plan in cooperation with local governments, the Department of Community Affairs and the State Planning Board. When feasible, emphasis shall be given to area-wide planning.

(5) Provide technical assistance to municipalities, counties and authorities including the training of personnel.

(6) Report to the legislature from time to time on further assistance that will be needed to administer the solid waste management program.

(7) Initiate, conduct and support research, demonstration projects, and investigations and coordinate all State agency research programs pertaining to solid waste management systems.

(8) Establish policies for effective solid waste management systems.

(9) Issue such permits and orders and conduct inspections as may be necessary to implement the provisions of this act and the rules, regulations and standards adopted pursuant to the act.

Section 7. Applications and Permits.—(a) It shall be unlawful for any person, municipality, county or authority to use or continue to use their land or the land of any other person, municipality, county or authority as a solid waste processing or disposal area of a solid waste management system without first obtaining a permit from the department: Provided, however, that this section shall not apply to farmers and they shall not be required to obtain a permit for normal farming operations: And, provided further, that this section shall not apply to the storage of by-products which are utilized in the processing or manufacturing of other products.

(b) Application for a permit shall be in writing and shall be made on a form prescribed, prepared and furnished by the department and shall set forth such information and be accompanied by such data as the department may require.

(c) Upon approval of the application, the department shall issue a permit for the operation of each solid waste processing or disposal facility or area set forth in the application.

(d) Plans, designs and relevant data for the construction or alterations of solid waste processing and disposal facilities and the location of solid waste processing and disposal areas shall be prepared by a registered professional engineer and shall be submitted to the department for approval prior to the construction, alteration or operation of such facility or area except when food process wastes are used for agricultural purposes in a manner which will not create a public health hazard or pollution of the air or water.

(e) Any permit granted by the department, as provided in this act, shall be revocable or subject to suspension at any time the department shall determine that the solid waste processing or disposal facility or area is, or has been conducted in violation of this act or the rules, regulations, or standards adopted pursuant to the fact, or is creating a public nuisance.

(f) In any case where a permit is required by this section for the disposal of solid wastes produced by a public utility or a municipally owned facility producing a public utility service, the department shall not refuse an application, or revoke or suspend a permit previously granted, unless it first obtains from Pennsylvania Public Utility Commission a certification that such refusal, revocation or suspension will not adversely affect utility service to the public.

(g) In case any permit is denied, suspended or revoked, a hearing shall be held thereon before the department within fifteen days after request therefor is made by the person, municipality, county or authority whose permit is denied, suspended or revoked. Within seven days following the date of such hearing the department shall notify all parties in writing of the determination of said hearing and the reasons therefor. Any party aggrieved by this determination shall have the right of appeal in accordance with the provisions of the act of June 4, 1945 (P.L. 1388), known as the "Administrative Agency Law."

Section 8. State Agencies.—All State institutions and agencies, including the General State Authority and the State Public School Buildings Authority, shall obtain a permit from the department under the provisions of section 7 of this act and shall also comply with all other provisions of this act.

Section 9. Prohibited Acts.—It shall be unlawful for any person, municipality, county, or authority to:

(1) Dump or deposit, or permit the dumping or depositing of any solid wastes onto the surface of the ground or into the waters of the Commonwealth without having obtained a permit as required by section 7: Provided, that this provision shall not prohibit the use of solid wastes in normal farming operations or in the processing or manufacturing of other products in a manner that will not create a public nuisance or adversely affect the public health: And, provided further, that this provision shall not prohibit individuals from dumping or depositing solid wastes resulting from their own residential activities onto the surface of ground owned or leased by them when such wastes do not thereby create a public nuisance or adversely affect the public health.

(2) Construct, alter or operate a solid waste processing or disposal facility or area of a solid waste management system without a permit or other approval from the department or in violation of the rules, regulations, standards, or orders of the department.

(3) Burn solid wastes except in a manner approved by the Air Pollution Commission or the department.

(4) Store, collect, transport, process or dispose of solid waste contrary to the rules, regulations, standards or orders of the department or in such a manner as to create a public nuisance.

(5) Refuse to hinder entry and inspection by an agent or employe of the department after such agent or employe identifies himself and gives notice of his purpose.

No person shall be held responsible under the provisions of this section for the dumping or depositing of any solid waste on ground owned or leased by him without his expressed or implied consent, permission or knowledge.

Section 10. Powers and Duties of Municipalities.—(a) Each municipality with a population density of three hundred or more inhabitants per square mile shall be responsible for the collection, transportation, processing and disposal of solid wastes within its boundaries.

(b) In carrying out its responsibilities, any such municipality may adopt ordinances, regulations and standards for the storage and collection of solid wastes which shall be in conformity with the rules, regulations, standards and procedures adopted by the department for the storage, collection, transportation, processing and disposal of solid waste.

(c) Municipalities may contract with any person, other municipality, county or authority to carry out their responsibilities for the collection, transportation, processing and disposal of solid wastes.

Section 11. Orders to Municipalities.—(a) If the department finds that the storage, collection, transportation, processing or disposal of solid waste from a municipality subject to the provisions of section 10 (a) is causing pollution of the land, air or waters of the Commonwealth or is creating a public nuisance, the department may order the municipality to alter its storage, collection or transportation systems or provide such storage, collection or transportation systems as will prevent pollution and public nuisances. Such order shall specify the length of time, after receipt of the order, within which the facility or area shall be repaired, altered, constructed or reconstructed. Any party aggrieved by an order under this section shall have the right of appeal in accordance with the provisions of the act of June 4, 1945 (P.L. 1388), known as the "Administrative Agency Law."

(b) Any municipality ordered by the department to repair, alter, construct or reconstruct a solid waste facility or area shall take such steps for the repair, alteration, construction or reconstruction of the facility or area as may be necessary for the processing and disposal of its solid waste in compliance with this act and the rules, regulations, standards, and orders of the department.

(c) The department may institute an action in mandamus in the court of common pleas of the county in which the municipality is located to compel compliance with an order issued under subsection (a) of this section.

Section 12. Grants Authorized; Appropriation.—(a) The department is authorized to assist counties, municipalities, and authorities by administering grants to pay up to fifty per cent of the costs of preparing official plans for solid waste management systems in accordance with the requirements of this act and the rules, regulations and standards adopted pursuant to this act, and for carrying out related studies, surveys, investigations, inquiries, research and analyses.

(b) All grants shall be made from funds appropriated for this purpose by the General Assembly.

(c) Any municipality with a population density of less than three hundred inhabitants per square mile may elect to be governed by the provisions of this act or to establish within such municipality waste disposal districts subject to the provisions of this act, and such municipality shall thereby become eligible for grants under this section.

(d) The sum of fifty thousand dollars ($50,000), or as much thereof as may be necessary, is hereby specifically appropriated to the department for the fiscal year July 1, 1968 to June 30, 1969.

Section 13. Restraining Violations.—In addition to any other remedies provided in this act, the secretary may institute a suit in equity in the name of the Commonwealth in the court of common pleas of the county where the violation or nuisance exists for an injunction to restrain a violation of this act or the rules, regulations or standards adopted thereunder and to restrain the maintenance of a public nuisance.

Section 14. Penalties.—(a) Any person violating this act or the rules, regulations or standards thereunder shall, upon conviction thereof in a summary proceeding, be sentenced to pay a fine of not more than three hundred dollars ($300) and costs and, in default of the payment of such fine and costs, shall undergo imprisonment for not more than thirty days.

(b) Violations on separate days shall be considered separate and distinct offenses under subsection (a) of this section.

(c) All fines and penalties imposed under the provisions of this section shall be paid into the General Fund of the Commonwealth.

Section 15. Severability Clause.—The provisions of this act are severable and if any provision or part thereof shall be held invalid or unconstitutional or inapplicable to any person or circumstances, such invalidity, unconstitutionality or inapplicability shall not affect or impair the remaining provisions of the act.

Section 16. Saving Clause.—Nothing in this act shall be deemed to affect, modify, amend or repeal any provision of any act administered by the Department of Health, Sanitary Water Board, Air Pollution Commission, Department of Mines and Mineral Industries or any other department, board, commission or agency of the Commonwealth.

Section 17. Effective date.—Section 4 shall take effect immediately. Section 5 and subsection (a) of section 12 shall take effect January 1, 1969. The remainder of the act shall take effect January 1, 1970.

APPROVED—July 31, 1968.
RAYMOND P. SHAFER
Governor

appendix b: suggested outline of a solid wastes management ordinance

Area of Jurisdiction

- A. Name of ordinance, date adopted, citation
- B. General statement
  - 1. Finding of necessity and declaration of policy and intent
  - 2. Definitions (see Solid Waste Disposal Act of 1967, P.L. 89-272)
- C. Administration
  - 1. Agency or agencies responsible for administration of solid wastes program
  - 2. Functions and powers of responsible agency or agencies, e.g.:
    - a. Require submission of plans
    - b. Issue permits
    - c. Adopt regulations and standards
    - d. Supervise the execution of all solid wastes laws
    - e. Institute proceedings to prosecute violators
    - f. Operate the service
  - 3. Appointment of an advisory board (if desired)
  - 4. Participation in programs with other communities
  - 5. Coordination of local program with state solid wastes management plan
- D. Scope of legislation
  - 1. Standards and regulations
  - 2. Prohibited activities
  - 3. Approved operations of solid wastes facilities
- E. Enforcement
  - 1. Inspection procedure
  - 2. Liability for violations
  - 3. Revocation of permits, licenses, or registrations
  - 4. Administrative proceedings
  - 5. Penalties and fines
  - 6. Performance bonds
  - 7. Injunctive powers

3 planning

planning

SITE OF FUTURE
CITY OF PHOENIX
DEER VALLEY PARK
BEING PREPARED BY SANITARY LANDFILL
PARKS DEPARTMENT • PUBLIC WORKS DEPARTMENT

By planning the final use of a sanitary landfill before its completion, Phoenix, Ariz., was able both to make the landfill conform to its final use and to generate public support.

introduction

Chaos or order? Traditionally, government has not anticipated problems but has waited until necessity demanded that elected officials do something. *Too often elected officials have ignored solid wastes management until a crisis arose.* By planning for solid wastes collection and disposal, elected officials can meet expected change, produce desired change, and prevent undesired change. Within rural and urban areas solid wastes are accumulating rapidly. Immediate planning and action are needed. Each community should include in its comprehensive plan for community growth careful consideration of and recommendations for solid wastes management. Solid wastes plans must be coordinated with other plans, such as land use, health, and transportation.

Planning and implementation on an areawide basis are the responsibilities of local elected officials. Careful study and evaluation is necessary to ensure that wastes are collected and disposed of in ways which will not pollute the environment. Solid wastes planning includes land use planning for disposal sites (such as recreation and open space); transportation planning for hauling solid wastes; and public facilities and utilities planning for storage, collection, and disposal of solid wastes. Solid wastes planning proposes feasible recommendations for regulation and operations of the present and future which can be implemented as a continuing program by responsible elected officials.

Planning for solid wastes management (storage, collection, transportation, processing, recycling, and disposal) must be approached systematically. To protect the environment effectively the plan should encompass a broad solid wastes generation and disposal area.

The solid wastes plan should include a statement of its objectives; physical description of the area; survey and inventory of solid wastes as to quantities and characteristics; analysis of land use and population trends; examination of state laws and local ordinances; evaluation of revenue sources; and proposals for action.

who plans?

Each locality must determine the agency or agencies best suited to develop the solid wastes plan. This can be done by creating an interagency committee of planners, engineers, attorneys, and financial analysts who can contribute the necessary information. The assistance of a private consulting engineering firm with planning experience in solid wastes may be needed. Local officials will need to work closely with their consultants. The procedures for dealing with consultants and the problems that may arise are thoroughly discussed in *Guide Number 9, Personnel.*

A survey of planning reports by the National Association of Counties Research Foundation indicated that local planning for solid wastes was done by planning and engineering consultants; city or county planning departments; roads, engineering, public works or health departments; or a combination of local departments and consultants.

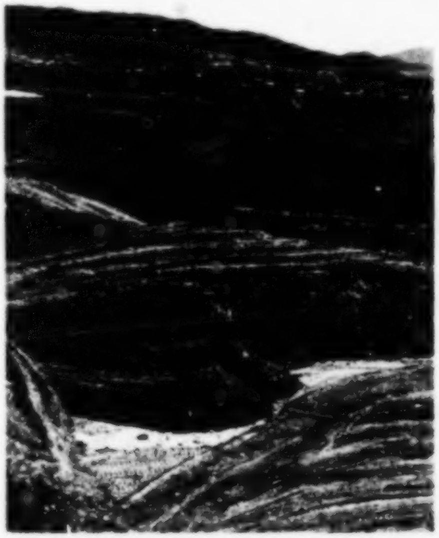
Regardless of who does the solid wastes plan, it must be accepted by the citizens before it can be effectively implemented. While formulating the plan, public hearings should be held to solicit the views of individuals and civic leaders. Citizen suggestions may not always be objective, but the hearings themselves may eventually help win their support for the solid wastes plan. For further information, see *Guide Number 8, Citizen Support.*

coordination of local with state plans

Early in the planning process elected political leaders should seek assistance from the designated state agency or agencies responsible for solid wastes management. In fact, some states are now requiring that local solid wastes plans be submitted to the appropriate state agency for approval before implementation. In such cases, local plans are reviewed by the state for adherence to minimum state standards and guidelines. Moreover, without local-state cooperation it is not likely that local planning will be eligible for federal financial assistance.

Some state solid wastes agencies are preparing preliminary solid wastes plans for local governments. For example, the Virginia plans include a map of the study area showing existing disposal sites; background information; definitions of terms such as storage, collection, and disposal of solid wastes; general description of the area; observations of current local collection and disposal methods and problems; and conclusions and recommendations.

The contours of the lifts shown in this California sanitary landfill have been designed to make the best use of the site.



financing the plan

Local officials should be prepared to pay for the entire solid wastes plan without waiting for state and federal assistance, which is limited.

A solid wastes plan involving several counties and cities may be paid for by apportioning the cost among participating jurisdictions. An example of this approach is the 1967 solid wastes disposal study for the Washington metropolitan region, which was financed by the Northern Virginia Regional Planning Commission, Metropolitan Washington Council of Governments, the Maryland-National Capital Park and Planning Commission, and a 701 urban planning grant from the federal Department of Housing and Urban Development. Funds from 701 grants must be used for comprehensive planning, not solely for solid wastes planning. A similar interstate solid wastes approach to planning was taken in New Jersey, New York, and Pennsylvania through the Tocks Island

Regional Advisory Council, which has been funded by the federal Bureau of Solid Waste Management.

Some states may pay for all aspects of a solid wastes planning study. New York State provides for 100 per cent financial assistance for countywide or intergovernmental comprehensive solid wastes management planning. (See *Guide Number 7, Technical and Financial Assistance* for additional information on state assistance.)

the planning process

The development of a comprehensive areawide plan is a long, complicated process. It includes determination of specific objectives, complete description of the physical area under study, examination of population statistics and trends along with land use data, and thorough survey and analysis of present and future solid wastes management needs. The development of a complete solid wastes plan takes time, but necessary action should not be delayed until the plan is completed. Because the accumulation of solid wastes is vast and unending, the planning for its management must be continuous. Plans written to guide change and development are themselves stimuli for further change. Thus, solid wastes plans should be updated periodically to meet changing conditions.

Solid wastes planning should cover at least a 20-year time span (which corresponds with normal lead time in comprehensive planning). This span is short enough to make realistic solid wastes projections based on population estimates and long enough to allow for acquisition of equipment and sites.

data collection

Description of Physical Factors. The plan should include a physical description of the study area including size, area of jurisdiction(s), topography, geology, climate, and air and water resources. The ability to meet solid wastes management needs is related to the physical environment. For example, planners who overlook topography, geology, and water resources might recommend an unfeasible disposal system.

Population and Land Use. Analysis of population and land use trends is a necessary prerequisite to solid wastes management planning. The weight, type, and volume of solid wastes generated are related to the population and the associated agriculture, commerce, and industry which support the population.

The rate of population change may offer important clues in developing realistic projections of solid wastes generation and feasible alternative solid wastes control programs.

Land use patterns indicate the major concentrations of residential, agricultural, commercial, and industrial development which will have a determinative effect on the size and location of future solid wastes facilities. Land is usually classified as agricultural, low and medium density residential, high density residential, commercial, industrial, park and open spaces, and public. For solid wastes purposes, business and commercial areas can be subdivided into food and non-food establishments. Food establishments generate considerable organic wastes that present a public health problem if not stored properly and collected regu-

interstate planning

Tocks Island Regional Advisory Council

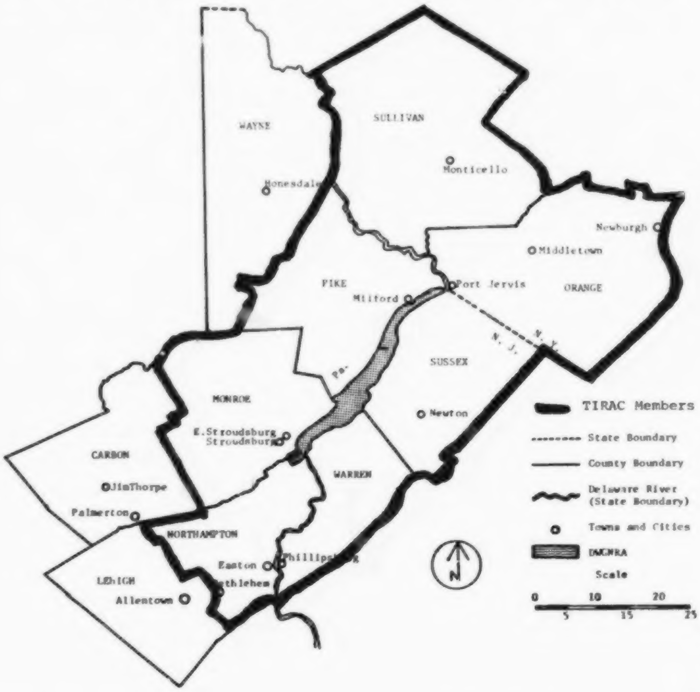
Located less than 100 miles from both the New York City and Philadelphia metropolitan areas, the Tocks Island region contains approximately 3,200 square miles, which embraces seven counties in Pennsylvania, New York, and New Jersey. The seven counties, unlike in many ways, share one great common resource, the Upper Delaware River.

Federal development of this resource over the next eight years through the construction of the Tocks Island Dam and the development of the Delaware Water Gap National Recreation Area (DWGNRA) will have a significant impact on all seven counties, and possibly other counties along the periphery of the region. This impact will stem largely from one factor: no less than ten million people are expected to visit the recreation area annually when it is in full operation. The recreation area will be the most heavily used facility in the entire National Park System.

For the counties of this recreation area, the question was how to organize and plan to handle millions of visitors on a seasonal basis and, in addition, prevent pollution of this beautiful region.

In 1965 concerned elected officials from the seven counties formed a council of governments known as the Tocks Island Regional Advisory Council (TIRAC). The member counties are Monroe, Northampton, and Pike in Pennsylvania; Orange and Sullivan in New York; and Sussex and Warren in New Jersey.

The Tocks Island Regional-Interstate Solid Waste Management Project began its studies June 1, 1967. The two-year project is the first interstate solid wastes study funded by the federal Bureau of Solid Waste Management. The total cost of this study was $192,000, two-thirds of which was federally funded ($128,000).


WAYNE
SULLIVAN
Honesdale
Monticello
Newburgh
Middletown
PIKE
Milford
Port Jervis
ORANGE
N. Y.
N. J.
Pa.
SUSSEX
MONROE
E. Stroudsburg
Stroudsburg
Newton
CARBON
JimThorpe
Palmerton
WARREN
NORTHAMPTON
Easton
Phillipsburg
LEHIGH
Bethlehem
Allentown
N
TIRAC Members
State Boundary
County Boundary
Delaware River (State Boundary)
Towns and Cities
DWGNRA
Scale
0
10
20
5
15
25

The purpose of this grant was to help a long-range model interstate solid wastes management system to be implemented by each member county. The following were the specific objectives of the study:

1) to determine the magnitude of the solid wastes disposal problem, now and in the future;

2) to determine the present pattern of solid wastes services and facilities presently needed;

3) to study disposal methods and collection procedures applicable to the area;

4) to determine legislative requirements;

5) to investigate the feasibility of developing a mathematical model to formalize the structural relationships which exist between solid wastes generators, disposal methods, and service areas;

6) to standardize the criteria for the evaluation of various solid wastes disposal possibilities;

7) to develop alternate solid wastes disposal plans suitable for meeting the needs of the area;

8) to develop an implementation program, including cost and financing figures;

9) to establish a continuing solid wastes program which TIRAC can undertake.

As of mid-1968, three TIRAC committees were in full operation. TIRAC staff officials were pleased with the cooperation given by member county governments and states.

larly. In most areas, land use data collected by local agencies for other purposes is available.

Survey of Solid Wastes. A knowledge of the diversity and kinds of solid wastes generated is essential to the planners. One classification of solid wastes is listed in Table I. Since many communities have no records of solid wastes quantities, installation of scales at disposal sites is necessary. Study conclusions will not be dependable without this basic quantitative data.

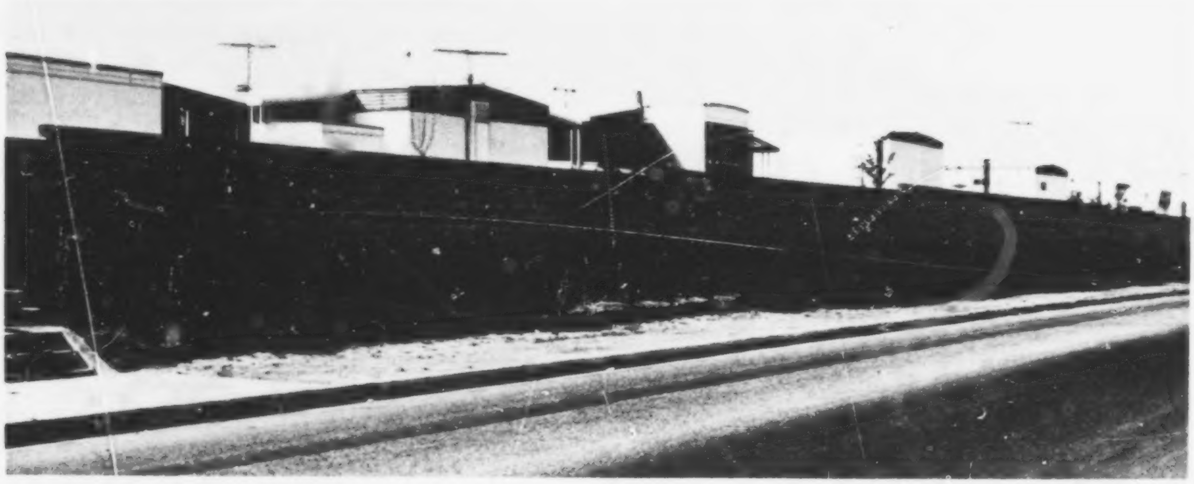
To collect solid wastes data, it may be necessary to conduct surveys in agricultural, commercial, industrial, and residential areas. Many agencies and consultants develop questionnaires to assist in collecting quantitative data. Mailing questionnaires to

TABLE I

GENERAL CLASSIFICATION OF SOLID WASTES MATERIALS

Garbage		Wastes from the preparation, cooking, and serving of food Market refuse, waste from the handling, storage, and sale of produce and meats	From households, institutions, and commercial concerns such as: hotels, stores, restaurants, markets, etc.
Rubbish	Combustible (primarily organic)	Paper, cardboard, cartons Wood, boxes, excelsior Plastics Rags, cloth, bedding Leather, rubber Grass, leaves, yard trimmings	
	Noncombustible (primarily inorganic)	Metals, tin cans, metal foils Dirt Stones, bricks, ceramics, crockery Glass, bottles Other mineral refuse	
Ashes		Residue from fires used for cooking and for heating buildings, cinders	
Bulky wastes		Large auto parts, tires Stoves, refrigerators, other large appliances Furniture, large crates Trees, branches, palm fronds, stumps, flotage	From streets, sidewalks, alleys, vacant lots, etc.
Street refuse		Street sweepings, dirt Leaves Catch basin dirt Contents of litter receptacles	
Dead animals		Small animals: cats, dogs, poultry, etc. Large animals: horses, cows, etc.	
Abandoned vehicles		Automobiles, trucks	
Construction & demolition wastes		Lumber, roofing, and sheathing scraps Rubble, broken concrete, plaster, etc. Conduit, pipe, wire, insulation, etc.	
Industrial refuse		Solid wastes resulting from industrial processes and manufacturing operations, such as food-processing wastes, boiler house cinders, wood, plastic, and metal scraps and shavings, etc.	From factories, power plants, etc.
Special wastes		Hazardous wastes: pathlogical wastes, explosives, radioactive materials Security wastes: confidential documents, negotiable papers, etc.	Households, hospitals, institutions, stores, industry, etc.
Animal and agricultural wastes		Manures, crop residues	Farms, feed lots
Sewage treatment residues		Coarse screenings, grit, septic tank sludge, dewatered sludge	Sewage treatment plants, septic tanks

Source: Adapted from American Public Works Association, *Refuse Collection Practice*, 1966, p. 15.



The City of Los Angeles, Calif., carefully operated this completed sanitary landfill so that it would support an attractive trailer court park.

individuals is not sufficient to obtain accurate information; personal field interviews should be used to supplement them.

Existing Solid Wastes Practices. Existing collection and disposal practices need to be examined. All collection and disposal practices, public and private, should be investigated to determine the owner, operator, location, size, hours of operation, adequacy, and life expectancy.

An engineering consultant hired by the South Carolina State Health Department for Richland County inventoried all unauthorized and authorized dumps and surveyed services provided by private operators and municipalities. The consultant summarized the survey as follows:

> Of all the authorized or legal disposal areas located throughout Richland County, none could be classified as meeting standards of operation to maintain a high level of environmental sanitation. . . . The inventory of waste disposal areas disclosed that 379 deposits of solid waste were in existence throughout the unincorporated county area. . . . Inadequate cover material, poor control of usage by the general public, prevalence of scavengers, breeding areas for pests, fire potential, water and air pollution potential, and other conditions contribute to potential health hazards. Furthermore, the limited number of such authorized areas invited indiscriminate disposal of solid waste along each of the county's roads.

It is equally important to determine the level of collection services and who provides them.

Once existing collection and disposal practices have been evaluated, planners are in a position to recommend regulations to correct existing deficiencies and to ensure good future solid wastes management operations.

Regulations. Whether or not local government operates any part of the solid wastes management system, it must regulate all aspects of the system. An important part of solid wastes planning should be careful examination of existing state laws and local ordinances to determine whether they are adequate. If not, comprehensive state and local laws should be recommended and actively sought.

new tools

Development of a solid wastes plan is a complex problem which can often benefit from the use of new planning tools such as systems analysis and the Planning-Programming-Budgeting-System (PPBS).

Systems Analysis. Systems analysis is basically a technical tool that can be used to organize and interpret information to help elected officials reach rational decisions. Ideally, systems

city-county planning

Genesee County and Flint, Michigan

The City of Flint, Genesee County, Michigan, and their industrial plants combined resources to conduct a comprehensive study of residential, commercial, and industrial wastes. The need for such a study became apparent when, in an effort to protect dwindling water supplies from contamination and to curb air pollution caused by open burning, the State of Michigan enacted a law controlling solid wastes disposal. If strictly enforced, the state law would have eliminated conical burners, the most common means of solid wastes disposal within the county.

Realizing the severity of the problem, a committee of representatives from Genesee County, Flint, and the local manufacturers' association applied for and received a study and investigaation grant from the Bureau of Solid Waste Management to investigate thoroughly and recommend methods of disposing of wastes for the entire county. A consulting engineering firm was retained to conduct the study of current solid wastes management practices, pinpoint deficiencies in the methods, and recommend a course of remedial action.

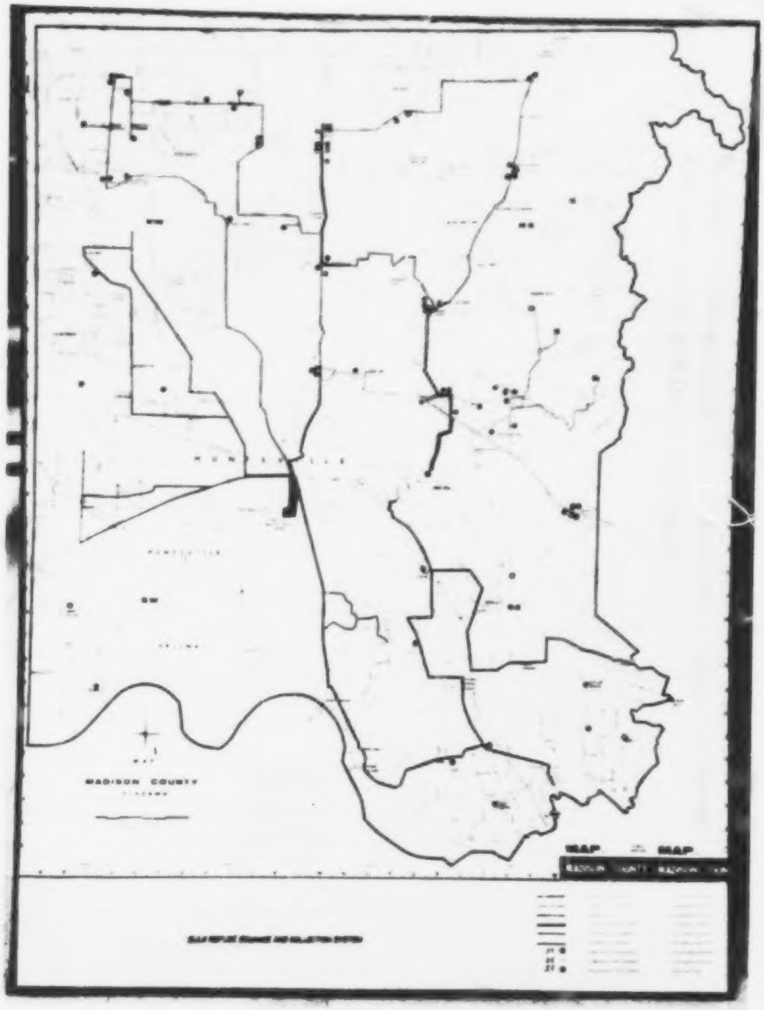
A survey of collection methods revealed that the Flint Public Works Department collects mixed solid wastes from domestic and small commercial establishments. In other parts of the county, private collectors perform this operation either under contract with the government or by arrangement with the individual resident or proprietor.

To determine the quantity and types of solid wastes generated by domestic and small commercial enterprises, the consultant analyzed solid wastes collected in the City of Flint for a selected period of time and projected these findings to the entire county. All solid wastes collected by the city public works department were weighed and separated according to type. Estimates of future generation of each type of solid wastes were made, based on population projections to 1995. Similar information on industrial wastes was determined with the complete cooperation of industry. Material was gathered from the Flint Industrial Waste and Pollution Control Committee.

Analysis revealed that methods of solid wastes collection, although varying from one jurisdiction to another within the county, were adequate, and that the need to improve them was not urgent. The primary problem facing the entire county was establishment of satisfactory disposal methods which would meet state standards.

Of the three methods of solid wastes disposal used in the county, only one, the sanitary landfill method used in Flint, was adequate. Satisfactory disposal methods had to be designed for the rest of the county. The consultant recommended establishment of sanitary landfills because they are relatively inexpensive to develop and operate. Four potential landfill sites were located from aerial maps and on-site inspections. The consulting engineer recommended the creation of a countywide disposal agency to operate the sites, which should be equipped to dispose of all domestic, commercial, industrial, and institutional solid wastes. Industrial wastes such as chemicals, oils, paints, and sludges required special treatment before being transferred to the landfills. Other wastes requiring special treatment before disposal include dead animals, which should be cremated before burial, and large logs and tree trunks affected by Dutch Elm disease.

The consulting engineer's study was submitted to city, county, and industrial officials in April, 1968. Plans to implement the report are being formulated.



Countywide planning is evident in this map of Madison County, Ala., showing the bulk refuse storage and collection system for both rural areas and Huntsville.

analysis seeks clear identification of one best program and the most efficient way of operating it.

The systems analysis technique was used by the California Department of Public Health, Bureau of Vector Control and Solid Waste Management, in a study supported by the federal Bureau of Solid Waste Management. In cooperation with private enterprise and selected local governments, California undertook a study of the community, industrial, and agricultural solid wastes management needs of central Fresno County.

The Fresno study developed a long-range conceptual management plan to meet predetermined health, aesthetic, legal, and socio-economic goals for the urban, agricultural and industrial communities in the rapidly urbanizing area. Because of the sophistication of this study, a computer was used by the consultants to process collected data quickly and understandably.

PPBS. The Planning-Programming-Budgeting System (PPBS) is a tool for public decision and policy formulation. This system is intended (1) to provide a continual review of government objectives, (2) to establish priorities for program action, and

checklist for data collection

- Determine the amount, character, and sources of solid wastes, including special solid wastes such as abandoned motor vehicles, diseased trees, water and waste treatment sludge, dead animals, and hazardous industrial and chemical wastes. Identify the proportions of wastes coming from residential, commercial, industrial, and agricultural areas.
- Determine the existing solid wastes management service areas, seasonal variations, and other local peculiarities of solid wastes generation.
- Determine the quality of storage practices from all solid wastes sources and identify practices that need improvement.
- Identify and determine the capacity, extent of service, quality, and other attributes of all collection systems (public, private, and individual).
- Determine the extent, acceptability, number, and type of on-site disposal and reduction methods, including at least residential back-yard burning, other open burning, on-site incineration, and garbage grinding.
- Identify all disposal, reclamation, reduction, and transfer sites and facilities. Determine the remaining life, cost, and acceptability of these facilities, both public and private.
- Account by weight for all solid wastes generated, transported, and disposed within the study area and for the movement of solid wastes into and out of the area.
- Identify legal rules, regulations, ordinances, administrative structures, and other local conditions that affect solid wastes management systems.
- Determine local political, economic, and social factors affecting solid wastes management.
- Describe and assess the existing solid wastes management systems and summarize the existing problem areas.
- Project future solid wastes management needs for the study area. For this projection, collect data on such items as population projections, future land use, zoning, industrial growth, recreation development, agricultural needs, and development of adjacent urban areas.

(3) to relate the effectiveness and cost of existing and proposed programs to their objectives. All pertinent costs are considered: direct, capital, non-capital, and associated support costs (such as employee benefits and building maintenance costs). PPBS is relevant to any local government project, including solid wastes management.

Use of PPBS requires (1) identification of government objectives; (2) identification of ways of carrying out the objectives; (3) estimation of the total cost of each alternative; (4) estimation of the expected results of each alternative; (5) presentation of the major costs and benefits of the alternatives, along with identification of major assumptions and uncertainties. Proper use of PPBS can help coordinate the solid wastes system's functions and eliminate duplication and mismanagement.

evaluation and recommendations

Before recommendations are offered, the planning process must include a thorough discussion and evaluation of the various public and private solid wastes system components. The conclusion of the plan should be concrete recommendations for regulation and operation of the most efficient solid wastes management system possible. Recommendations should reflect related factors that will influence the solid wastes system: public attitudes, state laws and standards, enabling legislation, local ordinances, rules and regulations, finances, organization, and personnel.

implementing the plan

Implementation is the most important part of the planning process. Planners should rate their recommendations by importance and outline a priority schedule for implementation. For example, elected officials may be urged to acquire solid wastes disposal sites promptly before the price becomes prohibitive or the land is developed for another use. Implementation of plans may be accelerated through a contract or franchise with responsible private solid wastes operators.

Plans should encourage elected officials to establish a capital projects fund to finance recommended solid wastes facilities. For example, in 1965, the Los Angeles County Refuse Disposal Trust Fund was set up to purchase future disposal facilities and to landscape and beautify sanitary landfills as they are completed. (See Field Report in Guide *Number 6, Financing.*) Without capital budgeting and the active support and interest of elected officials, the solid wastes managment plan will never become a reality.

multi-county planning

Tri-County Planning Commission, Michigan

Clifton, Eaton, and Ingham Counties, Michigan, and the 75 municipalities located within them were prompted by the passage of Act 87 of the 1965 Michigan legislature to evaluate existing facilities and formulate new methods of disposing of solid wastes. The Michigan law prohibits the continuation of dumps and open burning, and requires that operators of solid wastes disposal sites meet certain sanitation requirements to be eligible for an operator's license.

Many disposal sites operated by private firms or small communities in the tri-county area, which includes Lansing and Michigan State University, could not meet the state's new sanitation requirements. Because all three counties were faced with the problem, the governing boards of each asked the Tri-County Planning Commission to study the problem on an areawide basis.

Early in 1966, the planning commission initiated a study to determine the present status of solid wastes disposal; to develop criteria for future disposal; and to recommend future disposal practices and financial alternatives. It was assisted by an advisory commission of county representatives and a technical subcommittee composed of the county environmental sanitarians and two representatives of the state health department.

An inventory of existing collection practices and disposal sites was undertaken. The study of collection practices revealed wide variations within the 75 municipalities.

Some disposal sites in the three counties were located by information received from private collectors and disposal operators and state and county health officials. Other sites were located by studying land use maps and aerial photographs. Each site was classified as a sanitary landfill, modified landfill, or open dump. The expansion potential of the sites was evaluated and this information was recorded on a map.

When the survey of existing collection practices and disposal sites had been completed, commission planners began to project future disposal needs and made recommendations. Three alternate courses of action were recommended: (1) establishment of an inter-community system; (2) assumption of responsibility by each of the three counties; or (3) creation of a single administrative agency for the entire tri-county region.

The arrangement favored by the commission was the establishment of a disposal system for each county under the administration of a single agency, preferably a road commission. The countywide approach was recommended because the amount of undeveloped land suited for refuse disposal was diminishing and natural limitations, rising costs, and restrictive political boundaries inhibited communities from dealing satisfactorily with disposal problems individually. The delegation of disposal authority to the road commissions was recommended because these agencies are already equipped with the necessary engineering expertise, personnel, and machinery. In addition, they own numerous abandoned gravel pits which could be converted to sanitary landfills.

The study of solid wastes disposal was received favorably by the three counties. Ingham County allocated $12,000 to its road commission for purchase of landfill sites. The sites will be designed to meet the needs of the entire county for 20 to 25 years, and can be expanded for use for 40 years. The other two counties are also following the planning commission's recommendations and are currently designing disposal systems.

summary

Unless elected officials begin to plan for solid wastes management, they will not be able to meet demands for service, produce changes, and prevent undesired effects. Each community should include in its comprehensive plan for community growth careful consideration of solid wastes management. Solid wastes plans must be coordinated with other plans.

To protect the environment effectively, a solid wastes plan should include a statement of its objectives; physical description of the area; survey and inventory of solid wastes as to quantities and characteristics; analysis of land use and population trends; examination of state laws, regulations, and ordinances; evaluation of revenue sources; and proposals for action.

Each locality must determine the agency or agencies best suited to develop the solid wastes plan. Early in the planning process, elected political leaders should seek assistance from the designated state agency or agencies responsible for solid wastes management. Officials should be prepared to pay for the entire plan without waiting for state and federal assistance.

Before recommendations are offered, the planning process must include a thorough discussion and evaluation of the various public and private solid wastes systems. The conclusion of the plan should be concrete recommendations for regulation and operation of the most efficient management system possible.

Implementation is the most important part of the planning process. Without capital budgeting and the active support and interest of the elected officials, the solid wastes management plan will never become a reality.

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Refuse Collection Practice, American Public Works Association, 1313 East 60th Street, Chicago, Illinois 60637, 1966. Price: $10.

Sorg, Thomas J. and H. Lanier Hickman, Jr., *Sanitary Landfill Facts*, U.S. Public Health Service Solid Wastes Program Publication Number 1792, U.S. Government Printing Office, 1968. Price: $.35.

Waste Management and Control, A Report to the Federal Council for Science and Technology, Publication 1400, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, D. C., 1966.

procedure for formulation of a solid wastes management plan

- **Consider alternative solid wastes management systems for the study area. Each proposed system may combine several storage, collection, and land disposal methods.**
- **Consider the alternative systems in the light of public health protection; prevention of environmental pollution; public sentiment; aesthetics; political and jurisdictional effects; and anticipated growth and shift in solid wastes generation, population, industry, etc.**
- **Compare the alternative systems on an economic basis, including the costs and benefits of environmental and public health protection.**
- **Select a system from among the alternatives.**
- **For the recommended system include capacities, cost, source of revenue to operate the system, functions, organization, general locations, operating scheme, staging of construction, and design technicalities.**
- **If needed to enhance facilities or implement the recommended system, identify and suggest appropriate public information programs, financial arrangements, and other details.**
- **Recommend needed legislation (standards, rules, and regulations) at the local and state levels.**
- **Provide for expansion and flexibility and allow for adjustment of the system.**
- **Recommend what elected officials should implement immediately.**

appendix

State Solid Waste Planning Agencies

State	Solid Waste Planning Agency and Address
Alabama	State Department of Public Health, State Office Building, Montgomery, Alabama 36104 (205/269-7632)
Alaska	State Department of Health and Welfare, Pouch H, Juneau, Alaska 99801 (907/586-6311)
Arizona	Division of Environmental Health, Hayden Plaza, 4019 North 33rd Avenue, Phoenix, Arizona 85017 (602/371-4642)
Arkansas*	Arkansas Pollution Control Commission, 1100 Harrington Avenue, Little Rock, Arkansas 72202 (501/371-1701)
California*	State Department of Public Health, 2151 Berkeley Way, Berkeley, California 94704 (415/843-7900 Ex. 552)
Colorado*	State Department of Health, 4210 East 11th Avenue, Denver, Colorado 80220 (303/388-6111 Ex. 323)
Connecticut*	State Department of Health, 79 Elm Street, Hartford, Connecticut 06115 (203/566-2211)
Delaware*	Bureau of Environmental Health, State Board of Health, Dover, Delaware 19901 (302/734-5711 Ex. 416)
Florida*	State Department of Health and Rehabilitative Service, P.O. Box 210, Jacksonville, Florida 32201 (904/354-3961)
Georgia*	State Department of Public Health, 47 Trinity Avenue, S.W., Atlanta, Georgia 30334 (404/688-4033 Ex. 281)
Hawaii*	State Department of Health, P.O. Box 3378, Honolulu, Hawaii 96801 (808/548-2811 Ex. 521)

*States with solid waste management planning grants.

Idaho*	State Department of Health, Statehouse, Boise, Idaho 83701 (208/384-2390)
Illinois	State Department of Public Health, State Office Building, 400 South Spring Street, Springfield, Illinois 62706 (217/525-6580)
Indiana*	Division of Sanitary Engineering, State Board of Health, 1330 West Michigan Street, Indianapolis, Indiana 46207 (317/633-4420)
Iowa	State Department of Health, State Office Building, Des Moines, Iowa 50319 (515/281-5345)
Kansas*	State Department of Health, State Office Building, Topeka, Kansas 66612 (913/296-3821)
Kentucky*	State Department of Health, 275 East Main Street, Frankfort, Kentucky 40601 (502/564-6716)
Louisiana*	State Department of Health, State Office Building, New Orleans, Louisiana 70160 (504/527-5111)
Maine*	State Department of Health and Welfare, Statehouse, Augusta, Maine 04330 (207/622-7131 Ex. 241)
Maryland*	State Department of Health, 2305 N. Charles Street, Baltimore, Maryland 21218 (301/383-3010 Ex. 8201)
Massachusetts*	Bureau of Solid Waste Disposal, Massachusetts Department of Public Works, 100 Nashua Street, Boston, Massachusetts 02114 (617/727-4293)
Michigan*	Division of Engineering, State Department of Public Health, Lansing, Michigan 48914 (517/373-6620)
Minnesota*	Minnesota Pollution Control Agency, 717 Delaware Street, S.E., Minneapolis, Minnesota 55440 (612/378-1320)
Mississippi*	State Board of Health, P.O. Box 1700, Jackson, Mississippi 39205 (601/354-6616)
Missouri*	State Department of Public Health and Welfare, Broadway State Office Building, 221 West High Street, Jefferson City, Missouri 65101 (314/635-4111 Ex. 245)
Montana*	Division of Environmental Sanitation, State Department of Health, Helena, Montana 59601 (406/449-2406)

*States with solid waste management planning grants.

Nebraska	Environmental Health Services, Statehouse Station, P.O. Box 94757, Lincoln, Nebraska 68509 (402/477-5211 Ex. 484)
Nevada	State Department of Health and Welfare, 201 South Fall Street, Carson City, Nevada 89701 (702/882-7870)
New Hampshire	State Department of Health and Welfare, State Health Building, 61 South Spring Street, Concord, New Hampshire 03301 (603/271-2747)
New Jersey*	Bureau of Solid Waste Management, Department of Environmental Protection, P.O. Box 1390, Trenton, New Jersey 08625 (609/292-7645)
New Mexico*	State Health and Social Services Department, 408 Galisteo Street, Santa Fe, New Mexico 87501 (505/827-2693)
New York*	Department of Environmental Conservation, 845 Central Avenue, Albany, New York 12206 (518/457-6603)
North Carolina*	Sanitary Engineering Division, State Board of Health, P.O. Box 2091, Raleigh, North Carolina 27602 (919/829-3589)
North Dakota*	State Department of Health, State Capitol Building, Bismarck, North Dakota 58501 (701/224-2382)
Ohio*	State Department of Health, P.O. Box 118, Columbus, Ohio 43216 (614/469-3730
Oklahoma*	State Department of Health, 3400 North Eastern, Oklahoma City, Oklahoma 73105 (405/427-6561)
Oregon*	State Board of Health, P.O. Box 231, Portland, Oregon 97207 (503/229-5955)
Pennsylvania*	Department of Environmental Resources, P.O. Box 90, Harrisburg, Pennsylvania 17120 (717/787-3780 or 717/787-7599)
Rhode Island*	State Department of Health, 331 State Office Building, Providence, Rhode Island 02903 (401/277-2234)
South Carolina*	Pollution Control Authority, P.O. Box 11628, Columbia, South Carolina 29211 (803/758-2915)
South Dakota*	State Department of Health, State Capitol, Pierre, South Dakota 57501 (605/224-3351)

*States with solid waste management planning grants.

Tennessee*	State Department of Public Health, 109 Capitol Towers, 510 Gay Street, Nashville, Tennessee 37219 (615/741-2951)
Texas*	State Department of Health, 1100 West 49th Street, Austin, Texas 78756 (512/454-3781)
Utah*	Department of Social Services, 44 Medical Drive, Salt Lake City, Utah 84113 (801/328-6121)
Vermont*	Agency of Environmental Conservation, Montpelier, Vermont 05602 (802/223-8444)
Virginia*	State Health Department, P.O. Box 12418, Norfolk, Virginia 23502 (703/420-3640)
Washington*	Department of Ecology, Building #7, Olympia Airport, Olympia, Washington 98501 (206/753-7523)
West Virginia*	State Department of Health, 1800 Washington Street, East, Charleston, West Virginia 25305 (304/345-2985)
Wisconsin	Department of Natural Resources, Box 450, Madison, Wisconsin 53701 (608/266-0158)
Wyoming*	Department of Health and Social Services, State Office Building, Cheyenne, Wyoming 82001 (307/777-7513)

*States with solid waste management planning grants.

4 organization

organization

introduction

Since solid wastes management is directly related to public health and safety, government's minimum responsibility is to set and enforce standards for safe solid wastes collection, treatment, and disposal. Local government may choose not to perform all or part of the physical operation of collection and disposal service (more than half of the solid wastes collection and disposal in the United States is provided by private enterprise). However, the responsibility remains with local officials to insure healthful management of municipal, industrial, commercial, agricultural, and residential solid wastes on both a short-term and long-term basis. This responsibility rests with all local governments, whether urban, suburban, or rural.

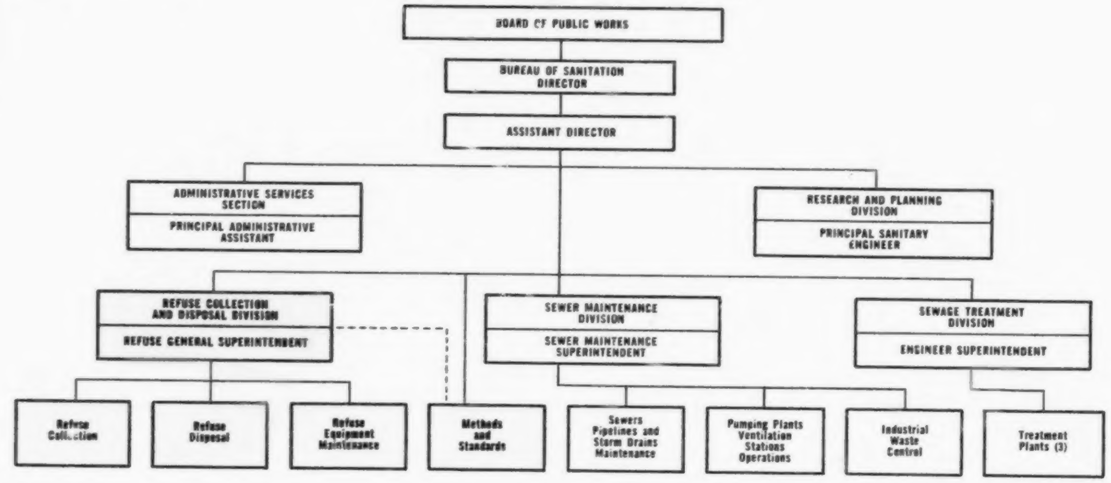
In many areas, cities have provided for collection and disposal of municipal and residential wastes but ignored the need to provide for commercial, agricultural, and industrial wastes. Most counties have not provided for any kind of solid wastes management.

To establish an efficient, coordinated solid wastes management system or to improve an existing system, the local elected governing board should determine in what way government departments are already associated with solid wastes management and how well the system is working. Often efficiency can be improved by reallocating functions so that the department which can handle them best is assigned the responsibility. In the majority of communities, which departments perform which functions de-

Sporadic litter control efforts will not prevent the scenic abuse along this Southern rural road. Organized efforts can make headway against illegal dumping and litter.

FIGURE A

CITY OF LOS ANGELES, CALIFORNIA
BUREAU OF SANITATION ORGANIZATION CHART


BOARD OF PUBLIC WORKS
BUREAU OF SANITATION DIRECTOR
ASSISTANT DIRECTOR
ADMINISTRATIVE SERVICES SECTION
PRINCIPAL ADMINISTRATIVE ASSISTANT
RESEARCH AND PLANNING DIVISION
PRINCIPAL SANITARY ENGINEER
REFUSE COLLECTION AND DISPOSAL DIVISION
REFUSE GENERAL SUPERINTENDENT
SEWER MAINTENANCE DIVISION
SEWER MAINTENANCE SUPERINTENDENT
SEWAGE TREATMENT DIVISION
ENGINEER SUPERINTENDENT
Refuse Collection
Refuse Disposal
Refuse Equipment Maintenance
Methods and Standards
Sewers Pipelines and Storm Drains Maintenance
Pumping Plants Ventilation Stations Operations
Industrial Waste Control
Treatment Plants (3)

pends primarily on how the system evolved and the balance established between public and private operation.

In solid wastes management, several levels of government and several departments within one level may play key roles. Lines of authority and responsibility must be clear so that authority will not be fragmented. In addition to the agencies which have primary operating responsibilities, important supporting roles are played by departments such as public information, planning, personnel, purchasing, accounting, and police. Whether the program is fragmented or effective depends on the way it is organized and the way the agencies coordinate their activities.

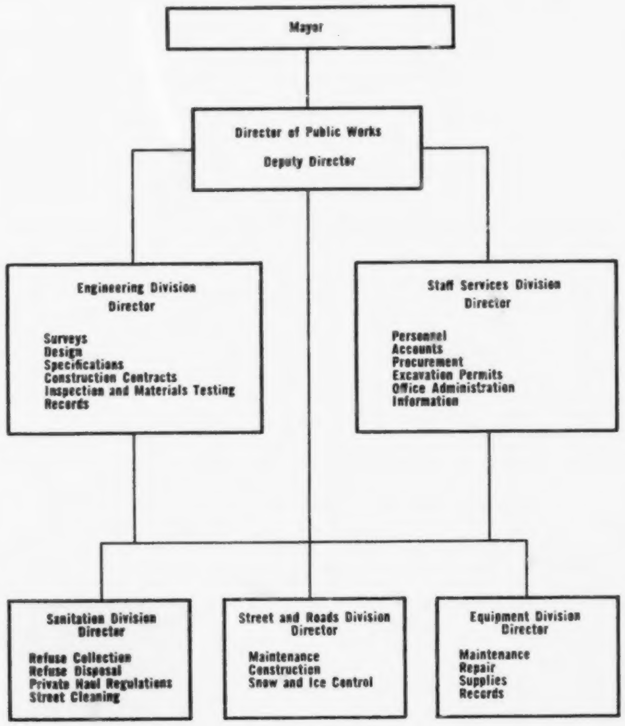
This guide discusses the major functions of a comprehensive solid wastes management system. These functions are policy making; public information; budgeting; planning and review; drafting, adoption and enforcement of standards; and operation of the system. Organization is the vehicle which provides for the implementation of these functions. When organizing a solid wastes management system, local officials should keep in mind the following criteria:

1. The system must operate without creating public nuisance or threat to public health and safety, no matter who performs the service.
2. The system selected must fit local needs.
3. The organizational pattern selected must be flexible enough to cover the largest feasible political and geographical area for solid wastes management.

The areawide approach to solid wastes management has been defined in Guide Number 1. If the areawide approach affects more than one jurisdiction, such as several municipalities within the county or even areas outside the county, it is necessary to determine:

1) how much the jurisdictions are willing to do together;
2) to what degree solid wastes practices will be regulated;
3) what parts of solid wastes management system will be

FIGURE B METROPOLITAN GOVERNMENT OF
NASHVILLE AND DAVIDSON COUNTY, TENNESSEE
DEPARTMENT OF PUBLIC WORKS ORGANIZATION CHART


Mayor
Director of Public Works
Deputy Director
Engineering Division
Director
Surveys
Design
Specifications
Construction Contracts
Inspection and Materials Testing
Records
Staff Services Division
Director
Personnel
Accounts
Procurement
Excavation Permits
Office Administration
Information
Sanitation Division
Director
Refuse Collection
Refuse Disposal
Private Haul Regulations
Street Cleaning
Street and Roads Division
Director
Maintenance
Construction
Snow and Ice Control
Equipment Division
Director
Maintenance
Repair
Supplies
Records

operated or furnished by the areawide government and what parts by the individual jurisdiction;

4) what parts of the system will be handled by private industry and by what means (contract or franchise).

Once these basic structural and functional decisions have been made, the next steps are to investigate the alternate methods of collection, processing, and disposal and to determine which ones best fill local needs, desires, and abilities.

assigning operating responsibilities

The main criteria for determining what place a solid wastes program should have in the organizational structure of a local government are that the system be easily identified by the public and that it be allocated ample funds, equipment, and personnel. In a small county, one person may be responsible for almost all functions. In a large county, one or more major departments may be necessary to do the job well. The magnitude of the solid wastes management program will guide the elected governing board in determining whether a separate department is needed. The following is a list of the advantages and disadvantages of having a separate department of solid wastes management:

ADVANTAGES	DISADVANTAGES
1. Separate budget 2. More visible to public and governing body 3. Total attention devoted to the problem 4. No sharing of equipment and personnel 5. Directly responsible to the elected governing board 6. Higher priority status	1. Further fragmentation of local government 2. Solid wastes may not be coordinated with related programs 3. May create duplication of some kinds of personnel, e.g., budget, research, accounting.

In most areas, a comprehensive solid wastes management system is still in the development stage. The only system that the National Association of Counties Research Foundation found that includes collection and disposal of all solid wastes produced in an area (residential, commercial, and industrial) is the City of Tacoma, Washington, Utilities Services Division of the Department of Public Works. The division also manages water and sewer services. (See Field Report in *Guide Number 6, Financing.*)

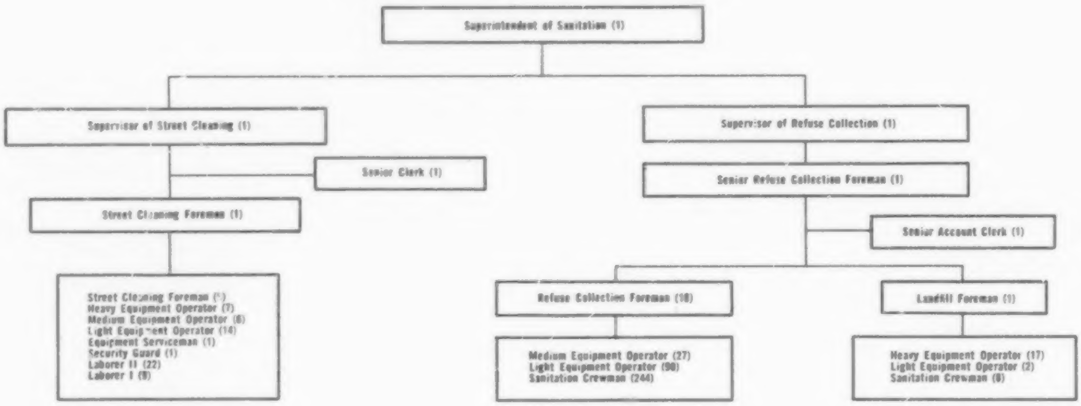
The following examples show some of the organizational structures possible. No one system, however, can be considered a "model."

The Department of Public Works of Nashville-Davidson County, Tennessee, is responsible for solid wastes collection, landfill. and road construction.

An example of a public works department which contracts for solid wastes collection, but operates its own incinerator and companion sanitary landfill is Montgomery County, Maryland. The department is also responsible for issuing collection service

FIGURE C

METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY, TENNESSEE
SANITATION DIVISION ORGANIZATION CHART
(Numbers indicate number of personnel holding position)


Superintendent of Sanitation (1)
Supervisor of Street Cleaning (1)
Senior Clerk (1)
Street Cleaning Foreman (1)
Street Cleaning Foreman ([illegible])
Heavy Equipment Operator (7)
Medium Equipment Operator (6)
Light Equipment Operator (14)
Equipment Serviceman (1)
Security Guard (1)
Laborer II (22)
Laborer I (8)
Supervisor of Refuse Collection (1)
Senior Refuse Collection Foreman (1)
Senior Account Clerk (1)
Refuse Collection Foreman (18)
Medium Equipment Operator (27)
Light Equipment Operator (90)
Sanitation Crewman (244)
Landfill Foreman (1)
Heavy Equipment Operator (17)
Light Equipment Operator (2)
Sanitation Crewman (8)

statements to homeowners and referring complaints. (See Field Report in *Guide Number 5, Design and Operation.)*

In San Bernardino County, California, a Refuse Disposal Department was established after the function of solid wastes disposal became so involved that it was separated from public works.

Philadelphia, Pennsylvania, assigns responsibility for solid wastes management to the Sanitation Division of the Department of Streets.

The Los Angeles, California, Board of Public Works, Refuse Collection and Disposal Division, has organized all collection activities on a district basis.

local government functions

The key functions of a solid wastes management system are:

Policy making
Public information
Budgeting
Planning and review
Drafting, adoption, and enforcement of standards
Operation of the system, including any or all of the following: storage, collection, transfer, salvage, volume reduction, and disposal.

policy making

Elected governing board members have a primary responsibility to make policy, inform the public, and appropriate funds for solid wastes management. Policy making is one aspect of a solid wastes management system which rests with the elected governing body, but may be delegated by it to a department head as needed. Questions of broad policy are the prerogative of the

FIGURE D

PHILADELPHIA, PENNSYLVANIA
DEPARTMENT OF STREETS ORGANIZATION CHART

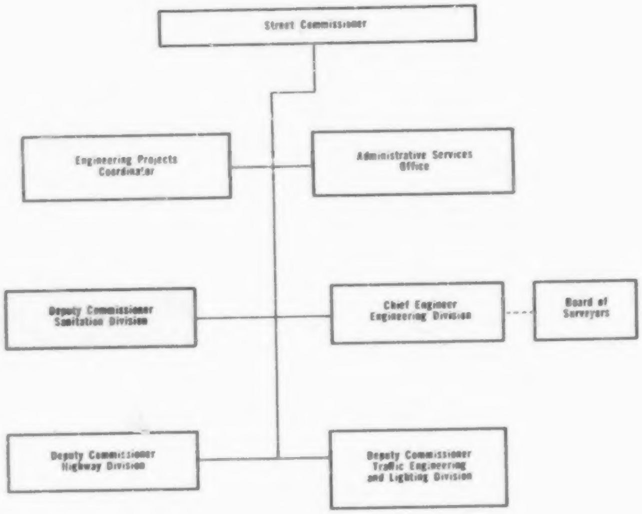
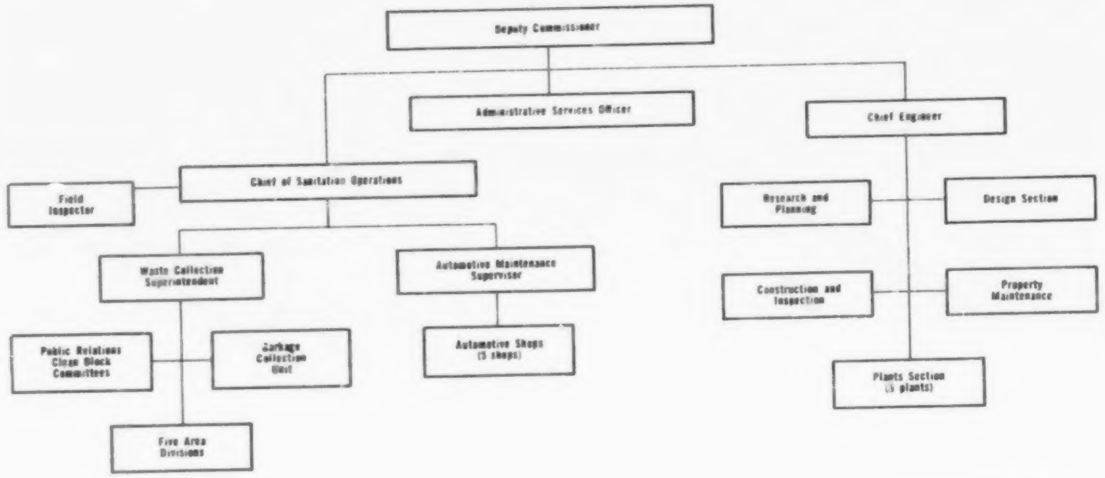

Street Commissioner
Engineering Projects Coordinator
Administrative Services Office
Deputy Commissioner Sanitation Division
Chief Engineer Engineering Division
Board of Surveyors
Deputy Commissioner Highway Division
Deputy Commissioner Traffic Engineering and Lighting Division

FIGURE E

PHILADELPHIA, PENNSYLVANIA
SANITATION DIVISION ORGANIZATION CHART


Deputy Commissioner
Administrative Services Officer
Chief Engineer
Chief of Sanitation Operations
Field Inspector
Research and Planning
Design Section
Waste Collection Superintendent
Automotive Maintenance Supervisor
Construction and Inspection
Property Maintenance
Public Relations Clean Block Committees
Garbage Collection Unit
Automotive Shops (5 shops)
Plants Section (5 plants)
Five Area Divisions

elected official, while day-to-day management decisions should be made by operating department heads.

Broad overall policy is the responsibility of the elected governing body regardless of who assists in preparing materials which lead to the policy decision. The elected official must be able to appoint the operating department head so that he will have confidence in him and accept his advice. Professionals, consultants, and department personnel are responsible for advising the elected official and providing meaningful information to assist him in making sound decisions.

Major policy decisions, such as final choice of disposal method, means of financing, and degree of areawide cooperation, are the responsibility of the elected governing board member. Internal administrative decisions, such as collection crew organization and vehicle design, should reside with the operating or service department head. Since solid wastes management involves political issues, the department head should keep the elected official up to date on department activities and anticipated problems.

With an areawide solid wastes management program, policy may have to be established in cooperation with other levels of government, for example, with the municipalities within a county. To maintain responsiveness to public needs, these policies should be determined in cooperation with other jurisdictions. The areawide organization should be structured so that policy responsibility rests with elected officials of general purpose governments.

public information

The elected governing board member has the responsibility to develop public understanding through leadership. Keeping citizens aware of what constitutes good solid wastes management is important. Information programs must be undertaken to educate the community and to provide the climate or attitude to insure a successful program. Ultimately, the public holds the elected governing board member responsible for the quality of the program; his political future is related to it. (See *Guide Number 8, Citizen Support.*)

budgeting

Budgeting is a major aspect of policy making, and solid wastes management is a necessary part of the cost of living. The cost of providing solid wastes management should be ranked with the cost of providing other necessities such as water, sewage collection and treatment, electricity, and gas.

Solid wastes management is one of the highest budget items of local government. However, few solid wastes management budgets provide adequate funds for items such as competitive salaries, safety, training, equipment maintenance, or office space. These aspects are especially important and are frequently overlooked. (For a more complete discussion, see *Guide Number 6, Financing,* and *Guide Number 9, Personnel.*)

Because there are few federal and state programs which provide financial assistance to local government for solid wastes management, the local government must be prepared to spend its own money to do the job well. (See *Guide Number 7, Technical and Financial Assistance.*)

planning and review

Who does the planning depends on what kind of planning must be done. To develop a comprehensive solid wastes management system, plans must be formulated in the following areas:

metro experiment

Metropolitan Government of Nashville-Davidson County, Tennessee

Consolidation of the governments of the City of Nashville and Davidson County affected every activity of the two units. Solid wastes management was no exception.

Under the consolidated government, solid wastes collection and disposal are the responsibility of the Department of Public Works (DPW). The DPW, one of seven departments of the metropolitan government, is accountable directly to the elected chief executive, the county mayor. Five divisions make up the department: one, the sanitation division, is responsible for solid wastes collection and disposal, regulation of private haulers, and street cleaning. The sanitation division accounts for 40 per cent of DPW personnel (see Figures B and C).

The new government established an "urban service and taxing district," and a "general service and taxing district." The urban district is the same as the old City of Nashville, where solid wastes collection and disposal are provided by the government. In the general service district (the rest of the county), collection is handled by government-licensed collectors and only the disposal sites are a direct government function. Solid wastes collection has been changed to a four-day, 40-hour week arrangement in the urban district. This provides twice-a-week collection for all areas and daily collection in the central business district. The licensing of private collectors for the general district and for certain urban district solid wastes requires the inspection of new equipment and annual inspection of all preliminary fact-finding; study and investigation; decision and action; and engineering. (See *Guide Number 3, Planning.*)

Formulating a solid wastes management system that meets needs requires careful planning. Many local departments should contribute to the solid wastes plan, which must be developed within the framework of the comprehensive plans for land use and economic development. Before ordering any study, the official must decide what he needs to know so that the study findings will have value.

Even after the solid wastes program is established, continuing data collection and review of information is needed to keep the program up to date. This data collection and review shoud be built into the system. The City of Los Angeles expanded its information system so that useful data would be provided automatically each day to help maintain and improve high quality operating standards.

drafting, adoption, and enforcement of standards

Drafting and adoption of standards for good solid wastes control is a responsibility shared by the policy makers with the department heads. Local custom and the limitations set by charter, the state legislature, or local governing body determine what body has the power and responsibility to make whatever laws, ordinances, and regulations are needed for solid wastes control. (See *Guide Number 2, Legal Authority.*) In matters pertaining to public health, the health department should have broad powers

other equipment. Collection charges are not regulated.

As of early 1968, the Metro government operated seven disposal sites, four in the urban district. Three are government owned; the remainder are leased at no cost from private individuals. Waste at the disposal sites is covered and has not been the object of protest. Finished disposal sites are currently being used for community development, such as industrial and commercial warehousing.

Management personnel in the solid wastes program have come up through the ranks. The same in-house approach applies to recruiting and training. The DPW does its own recruiting but the Metro Civil Service Commission conducts the examinations. No specific in-service training takes place aside from on-the-job training. Turnover is low at the management level, but very high in the lower personnel classifications of the solid wastes collection section.

Extensive attention is given by the DPW director to the collection function. Thorough records are kept on collection equipment, crew size, location of refuse, pickup, and weight as they relate to route time. Routes, crew size, and collection equipment are adjusted to obtain maximum use of resources. As a consequence, few complaints about refuse collection have been received. Work is underway to computerize this data.

While the quality of collection reflects the active interest and support of the director, the disposal sites do not reflect an equally intensive interest. Disposal site operators receive only on-the-job training. Equipment operating personnel at the sites seemed insufficient at the time of field inspection. Several landfills are located where earth cover material is insufficient for daily cover. The ease with which disposal sites have been located and obtained in the past has probably minimized pressure for true sanitary landfill operation with daily compaction and cover. Present sites are in or adjacent to the urban core area, but expanding development and rocky terrain will force future sites to be located well removed from the central urban core.

Expansion of collection will coincide with expansion of the urban service district because collection is considered one of the urban services. Such a decision is made by the council based on charter criteria.

to set standards through administrative regulations. All standards should be in accordance with state requirements.

Drafting, adoption, and enforcement of standards require the coordinated action of the elected officials and many local departments. Enforcement must be assigned primarily to a department which will pursue the task with vigor; failure to do so will result in pollution, public health deterioration, and ultimately public opposition.

Generally, the health department sets and enforces standards. In large urbanized areas, where the health department is involved in many areas of health control, enforcement powers may be shared with the public works department or some other operating agency. (See Seattle-King County, Washington, Field Report in *Guide Number 1, Areawide Approaches*.) These powers may be separated so that the health department sets standards related to environmental health and the public works department sets standards related to technical operating efficiency. In case of conflict, public health should take precedence.

Often the police department shares in enforcement by apprehending litterers and routinely patrolling known disposal sites. In Kansas City, Kansas, police issue a special warning citation, similar to a traffic ticket, for improper storage receptacles. Repeated violators are required to appear in court and may be fined up to $100.

A recent organizational trend is the concept of a department of environmental health which sets standards and implements pollution abatement programs, as well as operates the collection and disposal service. The Environmental Protection Administration (EPA) of New York City, established in March, 1968, is the first local single agency to be responsible for control of all types of pollution. "Organized the way we are, we can take a systematic and comprehensive look at our environmental problems," said the agency's first head, Dr. Merril Eisenbud, in *Environmental Science and Technology*.

EPA is a super agency composed of three operating branches: Department of Sanitation, Department of Water Resources, and Department of Air Pollution Control. Dr. Eisenbud cautioned:

> Certainly no administrative structure in itself is a panacea, but we feel we're in a better position to avoid trading off one form of pollution for another. For example, in 1951, the city started to require on-site incinerators in new construction to help . . . with its growing problem of refuse collection. Now we have 17,000 . . . and they're a major contributor to our air pollution.

Although it is not yet possible to judge the effectiveness of EPA, the consolidation of departments concerned with environmental protection into a single agency offers the prospect of a coordinated attack on pollutions, and is worth consideration by other local governments. However, a strong system of internal checks and balances is especially essential when a department sets standards for its own operations.

A department of licenses and inspection may be responsible for some aspects of enforcement, such as checking collection, transfer, and disposal vehicles (both public and private) for compliance with regulations. (See *Guide Number 5, Design and Oper-*

full city operation

Philadelphia, Pennsylvania

The City of Philadelphia, Pennsylvania, employs more than 2,800 men (100 in administration, 320 in disposal, and 2,380 in collection) in municipal collection and disposal operations. The agency is under the Deputy Commissioner of Streets, and includes sections for research and planning, design, and public relations (see Figures D and E).

The 1966 Annual Report of the Philadelphia Department of Streets outlined the following functions as the responsibility of the sanitation division:

1) *cleaning of public streets, alleys, and sewer inlets or catch basins;*
2) *collection of ashes, rubbish, and garbage from households and retail establishments;*
3) *disposal of all refuse removed by city forces by operation of incinerators and landfills for residue; also, the disposal of combustible refuse collected by private contract and industrial establishments and delivered to incinerators;*
4) *promotion of preventive measures to encourage citizen cooperation for a cleaner city through assistance, education, and law enforcement;*
5) *promulgation of ordinances and regulations pertaining to municipal sanitation; and*
6) *collaboration with the highway division in snow removal.*

sanitation management information system

City of Los Angeles, California

In 1963, the City of Los Angeles Bureau of Sanitation's Division of Research and Planning designed a basic systems approach to gather pertinent data to aid decision making for the city's solid wastes management personnel. For the previous 20 years, the city had used a time-consuming, manually compiled data system, which had become deficient in three important aspects: uniformity, speed, and accuracy. With increasing amounts of solid wastes to be handled, the manual recordkeeping system could no longer supply detailed information rapidly enough.

The City of Los Angeles covers over 454 square miles and in 1965 contained a population of about 2,600,000. Altogether 1,200,000 tons of solid wastes are collected and disposed of each year from approximately one million residential units within the city. To do this requires 1,350 people, of whom 950 are engaged in direct collection; the balance are in equipment maintenance and disposal activities.

To plan the new system, detailed requirements were compiled by the Division of Research and Planning after consultation with all of the supervisory levels involved. To replace the old information system quickly, the city engaged a systems engineering consulting firm.

The new reporting system is called "SANMIS" — Sanitation Management Information System. SANMIS serves as an organization tool because it compiles all pertinent solid wastes data into 27 separate reports for the five management levels so each level is informed about its area of responsibility. SANMIS provides daily, weekly, and monthly summaries.

In 1968 SANMIS was programmed to meet the following objectives:

1) *for each supervisory level, to provide information to increase visibility and control of operations, facilitate improved decision making, and assist in the identification and solution of problems;*
2) *to provide an historical data base for budget preparation and special studies;*
3) *to aid processing between acquisition of source data and preparation of payroll, personnel, and cost accounting; and*
4) *to reduce substantially the time lag between the close of the reporting period and the distribution of cost and analytical reports to management.*

Daily information is transmitted by remote control from each of the city's six solid wastes collection district offices to a central control unit located in the computer center at City Hall.

Special analysis programs have also been incorporated to predict solid wastes tonnages and workloads for work programming and budget purposes. Other reports are issued on such items as preventive maintenance coverage, personnel performance, and workloads.

City solid wastes management officials believe that SANMIS has improved the uniformity, speed, and accuracy of the collection and distribution of information required for effective daily decision-making at all levels of management. It has helped especially in preparing more accurate predictions of program needs. SANMIS has been in daily operation since mid-1967.

ation and Santa Barbara County Field Report in Guide Number 2, *Legal Authority.*)

Private operators should be required to post a performance bond and secure a license or permit to operate collection vehicles or a disposal site. Their operations should be checked frequently by local government inspectors so that high standards are maintained.

operation of the system

Local government has the responsibility to decide whether solid wastes collection or disposal or both will be performed by private industry or by government. The aspects of the operation which must be provided for are collection and disposal operations, street and roadside litter collection, equipment procurement, plant design and maintenance, planning for future needs, complaint handling, and contingency planning for natural disasters and tem-

organizing a refuse disposal department

San Bernardino County, California

Prior to 1963 the involvement of San Bernardino County, California, in solid wastes management was negligible, but in that year the county opened its first sanitary landfill. Between 1963 and 1967, solid wastes management was the concern of the county engineer and his public works department. By 1967, the number of sanitary landfills had increased to seven; with each new landfill, the organizational problems of operating an effective program covering a large land area grew significantly.

San Bernardino County (population 503,591) is the largest county in area in the country. Its climate and topography are varied. Agriculture is the main industry, but not the only one.

On July 1, 1967, the San Bernardino County Board of Supervisors established the Refuse Disposal Department as an independent department with the authority to operate a disposal program and regulate collection. Since manpower and equipment are permanently assigned to the department, the director does not have to wait until men and equipment assigned to other public works functions have "free time" to get the solid wastes control work done.

The department staff numbers near 60. Under the supervision of an experienced civil engineer are a fiscal assistant, scale foreman, and operations supervisor. The fiscal assistant, aided by two clerks, is in charge of budgeting and revenue projections, land acquisition, and fiscal coordination with the county board and the budget office.

The scale foreman and his 13 operators are responsible for weighing solid wastes, accrediting and receiving payment from customers, and preparing by punch card the initial billing of the large collection operators. Under the operations supervisor are two operations foremen who direct the work of 23 heavy equipment operators, four medium- and four light-equipment operators, and five regular laborers.

San Bernardino County is currently operating eight sanitary landfills and 24 dumps. The budget for this operation is slightly over $1 million. It is a self-sustaining program financed by fees and charges.

porary equipment failures. (To supplement the following discussion, see Guide Number 5, *Design and Operation* and Guide Number 9, *Personnel.*) No matter who operates collection and disposal, all aspects of the system must be coordinated by local government.

Government should analyze the costs and benefits of alternate arrangements to decide the best system of operation. In Seattle, Washington, collection is private, but transfer and disposal are publicly operated. In other areas, just the opposite is the case. Another combination is government collection of residential solid wastes, and private collection of industrial, commercial, and agricultural wastes. Disposal can also be divided. In Houston, Texas, the city operates a municipal incinerator, but also supplies Metropolitan Waste Conversion Corporation a certain daily tonnage of solid wastes for salvaging and composting (see Field Report in Guide Number 5, *Design and Operation*). In Los Angeles

Organization and coordination extend all the way down to the level of daily operations. The two San Bernardino County, Calif. operators in the top photo are obviously spreading and compacting landfill wastes as a well coordinated team. The same is true of the collection workers shown at bottom.

This is one of the terminals of the complex Sanitation Management Information System (SANMIS) operated by the City of Los Angeles for solid wastes management.

County, California, some sanitary landfills are government-operated, while others are privately run (see Field Report in this guide and in *Guide Number 1, Areawide Approaches*).

Collection. Local officials must decide whether government or private enterprise will provide collection service and what extent of service will be offered. Regulatory control must always be retained by local government.

In some urban areas the large private collection companies may provide better service, maintain better working conditions and safety standards, and can offer higher salaries than do government agencies. Government operations may be less able to adjust to increases in cost or to design special equipment to service new accounts. If private enterprise is available to do the job and can do so better and more cheaply, local government should limit its activities to regulation.

Several private companies serving the same area can cause inconvenience to residents, traffic congestion, or excessive noise. Local governments can minimize this by establishing separate zones or routes for each company. However, with this procedure, to protect the public local government should set the range of rates that haulers may charge. In Montgomery County, Maryland, residential solid wastes are collected under contract but the county handles the billing.

Other necessary regulatory measures include the submission of records, inspection and licensing of vehicles, and providing for contingencies to avoid interruption of service. (For a discussion of franchises and contracts as legal controls on private contractors, see *Guide Number 2, Legal Authority.*)

Disposal. The disposal method(s) chosen by the jurisdiction will influence the desirability of public or private operation. Although there are only a few privately owned and operated incinerators which contract with local governments to process residential solid wastes, this possibility may be considered. However, since it is not common practice, it will not be discussed here. (See *Guide Number 5, Design and Operation.*)

Private sanitary landfill operations are not unusual, and some companies operate nationwide. Local governments should deal only with companies which have an established record of quality performance. To select a competent private operator, the public official should visit operational and completed sites of potential operators to judge their performance. The best time to inspect a sanitary landfill is at the start or close of the day, unannounced, so that there can be no question about how the site is left overnight. This also applies to private operations which are not under contract, but must be regulated.

road department division

Orange County, California

As of 1967, the Orange County Planning Department estimated the county's population at 1,246,740. Proper disposal of solid wastes, about 25,800 tons per week, is the responsibility of the county's Refuse Disposal Division, under the overall direction of the commissioner of the Road Department.

The county's involvement in solid wastes disposal dates back to 1946. At that time disposal was handled by individual communities; open and burning dumps were prevalent, creating an intolerable situation. Action was taken to outlaw indiscriminate dumping and privately operated dumps by the Orange County Board of Supervisors on October 29, 1946. The board adopted an ordinance establishing and regulating the use of public disposal sites, and assigned the responsibility for properly maintaining them to the county Road Department, which had the necessary equipment.

Since 1946, the growth of the county's population and its service needs have been matched by a corresponding improvement in methods of solid wastes disposal. In November, 1959, the Board of Supervisors adopted the Road Commissioner's "Master Plan of Refuse Disposal." This plan established a system of long-range, high-capacity disposal sites and transfer stations strategically located.

Presently the 81 people in the Road Department's Refuse Disposal Division administer the proper disposal of solid wastes with an annual budget of over $2 million.

The Refuse Disposal Division has assigned personnel and equipment to each of the five sanitary landfill areas seven days a week. The refuse disposal engineer is responsible for the supervision of three public works foremen, 26 custodians and laborers, and 59 equipment operators.

No charge is made for solid wastes disposal. The current average cost to dispose of solid wastes in the five sanitary landfills is about $.60 per ton.

The county's long-range disposal site supply is adequate because of ample canyons throughout the county.

summary

No one organizational pattern for solid wastes management can be said to be best. Within local government many different organizational structures exist.

The division of operating responsibility between the public and private sectors and the size of the job to be done influence the assignment of the major responsibilities within a local government. The functions which must be fulfilled are policy making; public information; budgeting; planning and review; drafting, adoption, and enforcement of standards; and operation of the system. The allocation of these functions to local government departments must be such that a coordinated, effective solid wastes management system results. It is a system of checks and balances, to insure that each department fulfills its role. A solid wastes management system can work well with many organizations involved, or it can be a disastrous "buck passing" operation. It is up to the elected governing board to see that conscientious, qualified people are employed.

A city or county need not be densely populated to have a good solid wastes management system. A small community will have less solid wastes to collect and the organizational structure needed will be less complicated, but the same functions must be performed. Regardless of the size of the community, good organization is essential for effective solid wastes management.

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Good organization enables management systems which involve transfer stations to make the stations a connecting link between collection and disposal, rather than a dividing point.

5 design and operation

design and operation

introduction

This guide discusses the operation of collection, processing, and disposal systems. It is designed to assist the elected governing board member in selecting among the alternatives for solid wastes management systems. It should not be used in place of a detailed preliminary engineering study to determine local needs in developing a solid wastes management system.

The goal of a solid wastes management system is to maintain a healthful and aesthetically pleasing environment by providing for the regulation and operation of the best and most efficient system.

methods of storage and collection

storage

Storing solid wastes properly while they await collection is necessary so that they do not cause unsightliness or attract rats and flies. A 1967 study in California showed that household solid wastes containers have a high fly production rate and that twice-a-week collection as opposed to once-a-week collection reduces the total number of flies by more than 75 per cent. The Bureau of Solid Waste Management of the U.S. Public Health Service strongly urges that all solid wastes which contain garbage be collected at least twice a week.

It is usually the homeowner's responsibility to supply enough containers for his solid wastes and keep them in good condition. In public areas, such as bus stops, shopping centers, and parks, the local government must supply solid wastes receptacles. As part of an anti-litter program in Wichita, Kansas, enclosed trash cans purchased with the help of the Lions Club were placed at every intersection in the city.

Local government is responsible for defining "proper storage" and enforcing these standards. To obtain a construction permit, a builder should be required to show in the plans that he has made provision for solid wastes storage. In Columbia, Maryland, advertised as a "totally planned new town," standard trash cans at model homes are stored on the living room balconies. Such placement shows that even in a planned community, solid wastes storage often is overlooked. Tucson, Arizona, issued a booklet, "A Confidential Talk With Architects," to remind builders to include accessible solid wastes storage areas as an integral part of building design.

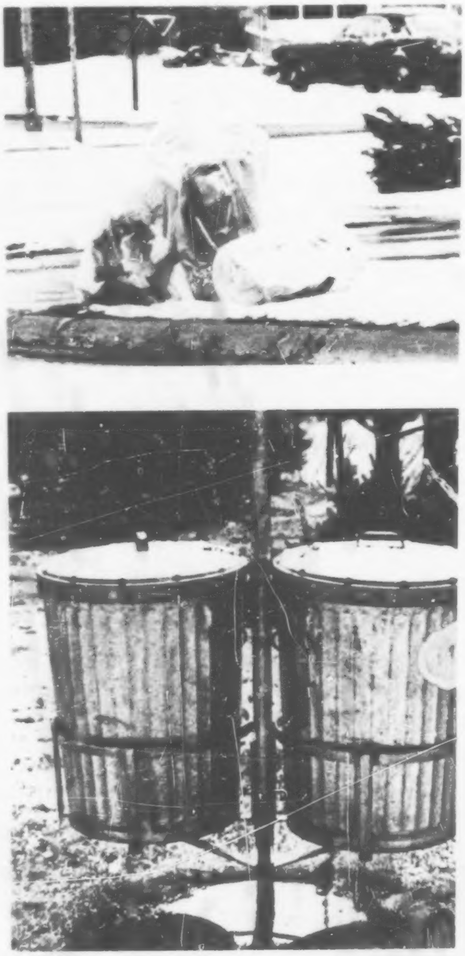
Cans (Metal and Plastic). The traditional tapered galvanized steel can has remained the most widely used household solid wastes can. Can size should be such that when loaded it weighs no more than 80 pounds. This is usually a 20-gallon to 30-gallon container. Fifty-five gallon drums are not acceptable since they are cumbersome and when loaded are too heavy for one man to pick up safely. Cans should be protected by storing them on a concrete base, or even better, by elevating them on a metal frame about 18 inches above the ground.

Plastic containers are usually lighter, easier to clean, and rustproof. However, many plastic containers cannot withstand freezing temperatures without cracking, and they are more susceptible to fire damage than metal cans. Both plastic and metal containers should have two secure handles, and tight lids without holes to keep out insects and rainwater.

Sacks (Paper and Plastic). Disposable plastic and paper refuse sack systems have been developed. Most plastic bags are designed for use as can liners, although some communities use them instead of cans or for special wastes such as leaves, grass, and other yard wastes. Paper sacks have many of the same advantages as plastic bags, and are somewhat less expensive.

Use of plastic and paper sack systems

ADVANTAGES	DISADVANTAGES
1. They are disposable and so do not have to be cleaned.	1. They are prey to attack by animals if no metal guard is used.
2. They speed collection since the collector does not have to carry a container back to the yard.	2. Arrangements are necessary to make holders and container guards available.
3. Spillage is lessened.	3. The user or local government must pay for a continuing supply of bags.
4. The number of bags set out is easily adjusted to immediate need.	4. The homeowner must be instructed in the use of holder and the storage requirements.
5. They are lightweight and easy to handle, reducing back injuries and insurance costs.	5. Closure of overfilled bags is often faulty.
6. Collection is quieter than with the can system.	6. The bag is an item of solid waste itself.



The plastic bags shown at curbside are used for residential collection in Mount Prospect, Ill. In Rockbridge County (Lexington), Va., sturdy, raised metal cans are used for residental storage.

With the refuse sack system, local government may supply homeowners with bags and racks or act as an agent selling to the owners so that the sacks will always be conveniently available.

The City of College Park, Maryland, distributes 25 weeks' supply (in 50-bag lots) of paper bags at a time. Residents may request and receive up to 25 additional bags during each 25-week period at no cost to the homeowner. Many communities use some form of the refuse sack as the recommended storage system.

Mobile Detachable Containers. The containerized storage system (mobile detachable unit) is best used for quantity waste producers and for wastes which are hard to handle. In most places, replacement of 30-gallon cans or 50-gallon drums with large 4-cubic-yard to 20-cubic-yard or even 40- to 50-cubic-yard containers has proven convenient and efficient. It especially speeds collection of large amounts of waste from commercial and industrial establishments. These containers are usually supplied by the collector.

paper sack storage system

Junction City, Kansas

For the last four years some citizens of Junction City, Kansas, a town of 20,000 population, have used paper sacks to store solid wastes for collection. The storage system is voluntary; citizens may use bags or traditional trash cans. Those using the paper bag service are furnished with a three months' supply of bags based on the use rate of two per week. Additional bags may be purchased for 10 cents each. The service costs $1.75 per month.

Property owners using the paper sacks are furnished a paper bag holder and some purchase a "shed" in which the bag and holder are stored. Containers are placed at the alley line to keep front yards attractive and litter-free. The city provides collection twice a week.

The use of paper bags reduces the possibility of back injuries and hernias among city collection works. The city manager of Junction City reported that after initiation of the paper bag system, insurance rates for refuse collectors dropped from $16,000 annually to $7,200.

Collectors prefer the paper refuse sacks because they weigh much less than the traditional metal trash cans and are much easier to handle. Homeowners prefer the paper sacks because they eliminate the unsavory chore of cleaning garbage cans and the need to replace cans which have been damaged by poor handling or rusting.

For collection, the container is mechanically lifted, emptied into the compaction truck, and replaced. Some early designs still in use require the container itself to be physically transported to the disposal site, emptied, and returned to the collection point; this wastes time and may leave the commercial establishment without a storage unit several hours on collection day. Other systems use large piggyback containers which fit on a flatbed truck. When the container is full, the truck brings an empty bin and takes the full one to the disposal site.

The containerized storage system is appropriate for commercial, industrial, agricultural, and apartment solid wastes. In rural and sparsely settled areas, containers are sometimes placed at convenient roadside locations for wastes storage since home-to-home collection costs may be prohibitive. (See Madison County, Alabama, Field Report in *Guide Number 8, Citizen Support.*) To conduct a successful program, enough containers must be supplied. They must be cleaned regularly to minimize odor and insect infestation, and solid wastes must be collected on a regularly scheduled basis (a minimum of twice a week).

To save storage space, some bins are equipped with their own compaction devices. The greater the compaction the fewer the storage units required. Where air pollution control regulations have outlawed the use of incineration in apartment buildings, these compacting bins can often replace the burner in the same space. In planning this kind of operation, care must be paid to accessibility of the storage units and the servicing of the compactor. Other systems reduce volume by shredding or pulping.

Other Storage Techniques. Some communities have backyard shelters or converted backyard burner shells where solid wastes are dumped. Collection crews periodically remove the solid wastes from the shelter. This method is inefficient and expensive; causes odors; draws rats and flies; and is a fire hazard.

One bad method is pit storage, where garbage can holders are built into the ground. Garbage spilled in the pit is rarely cleaned out, causing odors and harboring flies. This method is unacceptable since only small cans can be lifted from below ground level; many cans are required; and collectors must use improper positions to lift containers.

collection

The collection system is influenced by storage method, pickup point requirement, kind of waste, kind of equipment, labor available, and cost. The service provided influences the crew size per truck, as does truck capacity and travel time. Any collection system should have prescribed routes and days for collection.

Residential Collection Methods. If standard metal cans, refuse sacks, or plastic bags are used, there are five basic methods

FIGURE A: COMPARISON OF RESIDENTIAL COLLECTION SERVICES

	TYPE OF SERVICE				
CONSIDERATIONS	CURB SERVICE	ALLEY SERVICE	SET-OUT SET-BACK SERVICE	SET-OUT SERVICE	BACKYARD CARRY SERVICE
Requires homeowner cooperation:					
a) to carry empty cans	YES	OPTIONAL	NO	YES	NO
b) to carry full cans	YES	OPTIONAL	NO	NO	NO
Requires scheduled service for home-owner cooperation	YES	NO	NO	YES	NO
Poor aesthetically:					
a) spillage and litter problem	HIGH	HIGH	LOW	HIGH	LOW
b) cans visible	YES	NO	NO	YES	NO
Attractive to scavengers	YES	HIGHEST	NO	NO	NO
Prone to upsets	YES	YES	NO	YES	NO
Average crew size required for efficiency*	1-3 MEN	1-3 MEN	3-7 MEN	1-5 MEN	3-5 MEN
Crew time*	LOW	LOW	GREAT	MEDIUM	MEDIUM
Collector injury rate due to lifting and carrying	LOW	LOW	HIGH	MEDIUM	HIGH
Trespassing complaints	LOW	LOW	HIGH	HIGH	HIGH
Special considerations		Requires alleys and vehicles that can maneuver in them; less prone to block traffic; high vehicle and can depreciation rate			Requires wheeled caddy to roll filled barrels or the use of burlap carry cloth or hand carry bin; works best with driveway
Evaluation based on service to home-owners; cost due to crew size and time requirements	Poor service, low cost	Fair service, low cost	Good service, high cost	Fair service, medium cost	Good service, medium cost

* Presumes use of standard compactor vehicle.

of residential waste pickup service: curb service, alley service, set-out/set-back service, set-out service, and backyard service.

With curb service, the homeowner places his solid wastes container(s) at the curb on the scheduled day. Pickup men dump the wastes into the collection vehicle and replace the container at the curb. The homeowner must return the container to its normal storage area.

With alley service, solid wastes containers are stored on the homeowner's property at the alleyline. Pickup men empty the containers into the collection vehicle and replace the container in its normal storage area next to the alley.

With set-out/set-back service, "set-out" men go house to house taking full trash cans from yard to curbline; other men stay with the truck to empty cans; "set-back" men return the empty cans to the owner's yard.

With set-out service, the collector brings the waste can from the yard to curb and empties it. The homeowner carries the empty container back to the yard's storage area.

With backyard carry service, the collector carries a tote bin or burlap cloth to the yard, empties the can into the bin or carry-cloth, replaces the container, and carries the solid wastes to the collection vehicle.

In this example of backyard carry collection service, the collector first empties trash and garbage into a burlap cloth, which he then carries to the collection truck at curbside.

There are, of course, many modifications and adaptations of these methods to fit particular community needs, including the use of scooters, caddies, trains, etc. The five methods listed, however, are the basic systems now in wide use. (See Figure A: Comparison of Residential Collection Services.) For more information, see bibliography or consult an engineering firm with experience in designing collection systems. (See section on consultants in *Guide Number 9, Personnel.*)

Route and crew organization patterns must be integrated with the type and frequency of collection and with the amount of solid wastes to be collected. For example, provision must be made to accommodate seasonal variations. The first pickup of the week is usually heavier than the second; thus the daily work load may vary considerably. Since neighborhood conditions differ greatly, routes must be planned and adjusted on an individual basis.

Other Collection Methods. Food wastes grinders are not a disposal method, but volume reduction devices. In addition to residential use, they are in widespread use in restaurants, hotels, and other food processing establishments.

Food Wastes Grinder

ADVANTAGES	DISADVANTAGES
1. It lowers the moisture content of solid wastes to be collected.	1. It cannot handle all food wastes, such as large bones and fibrous materials.
2. It is convenient for homeowner.	2. The wastewater treatment plant or septic tank must be large enough to accommodate the additional wastes.
3. It eliminates most on-site garbage storage. If garbage collection has been separate, it can be eliminated.	
4. Fly and rat problems around storage containers can be reduced.	

Mostly under development and projected for the future, other collection systems flush wastes by water or air to a central collection point. They may be appropriate for multiple-family dwelling units, hospitals, and office buildings. These systems are expensive and may require a lot of maintenance. Pneumatic and flushing systems have been used in Europe for many years, but are just beginning to be considered in the United States.

Collection Equipment. Vehicle life depends in large measure on routine preventive maintenance. Daily maintenance should include cleaning inside and out. The driver should be responsible for a daily vehicle safety check, including inspection of brakes, windshield wipers, tail lights, back-up lights, tires, and hydraulic system, and report any irregularities for repair. Tune-up, overhaul, and repainting should be performed as needed during the year. The vehicle fleet should be large enough so that no route is short-changed when vehicles are out of service for routine repairs.

Any equipment or process which affords greater compaction probably brings long-range economy since more solid wastes can be handled conveniently at one time.

Compaction vehicles are desirable for the above reason and because they can reduce the number of trips to the disposal site.

Enclosed compactor collection vehicles should be metal and watertight, and have low loading height, safety features, fast compaction cycle (to speed collection), and high compaction pressure. Officials should include initial price and estimated annual operating and maintenance costs in making comparisons of various vehicle designs and makes. Prices vary from $10,000 to $100,000.

Some things to investigate before purchasing collection equipment are weight limits for all roads over which the vehicles will travel; vehicle stability (loaded and unloaded); turning radius; loading height; and vehicle height in the unloading position to be sure there is overhead clearance in transfer stations, service buildings, or incinerators.

safety features

Although not always standard equipment, vehicle safety features are essential for protection of employees and the public. Their additional cost will be returned in lower insurance rates, lower workmen's compensation, and lower sick leave payments. Packer design safety features should include:

- interior and exterior rear-view mirrors since backing accidents account for most vehicle damage and fatalities
- back-up lights
- four-way emergency flashers
- blade controls which can be reached by someone in danger to halt or release the compaction cycle
- protective coverings over all external moving parts to avoid danger of catching fingers and clothing
- a safe place for crew members to ride on short trips, with handholds and platforms big enough to safeguard against slipping
- first aid equipment
- fire extinguishers
- a warning indicator that can be operated from the rear of the truck

Mechanically self-loading collection vehicles (fork-lift equipped trucks) are frequently used with mobile detachable containers (bins) for non-residential collection. A bin is lifted automatically and emptied into the truck, which can be front, side, or rear loading, and may or may not provide compaction. The truck should be used with a crew of two: a driver and a helper to assist in rounding corners and backing safely. To lessen the danger of injuries, front-end loaders should be designed so that the lifting arms do not pass in front of the cab doors or windows.

Local governments should not permit open vehicles for general collection of solid wastes, but occasionally they can be used for bulky items if wastes are covered tightly. Open trucks are inefficient solid wastes collection vehicles. Private haulers often build up the wastes capacity of an open truck by makeshift additions of plywood panels. Such vehicles are usually of questionable safety, leak, and contribute to a poor public opinion of the solid wastes management profession. Open trucks used to collect garbage and rubbish are costly to operate due to no compaction, and require more frequent trips to the disposal site and possibly manual unloading.

The scooter system consists of a light-weight, motor-driven scooter with a bin attached. In Pasadena, California, a scooter with 1.3-cubic-yard (300 gallon) capacity bin is used for once-a-week backyard residential collection. When the scooter bin is full, after residential pickups, the bin is mechanically emptied into a 50-cubic-yard compaction truck which accompanies the scooters along the route. Each route is assigned two scooter units, one tote caddy, one truck, and a crew of four.

This method is suitable for mild climates where there is level terrain and little wind. It is especially convenient in residential neighborhoods where long driveways are standard. Back injuries are few since wastes are hand carried only a short distance.

In the train system, a light truck pulls a series of connected bins on wheels, called a "train." The train system provides efficient use of both the large compaction vehicle and crew. With this system, continuous communication between train and compaction vehicle is essential. When the bins are full, the driver contacts the packer vehicle driver by radio to tell him where to meet the train along the route. After the bins are emptied into the packer, it departs to meet another train or to go to the disposal or transfer site. A disadvantage of the train system is that it is difficult to maneuver on steep or narrow streets, and may allow littering.

items needing special handling

Some items require special storage, collection, and processing because they are difficult to handle and slow down routine operations. Large bulky wastes cannot fit into most regular compaction trucks. Certain wastes, such as tree and shrub branches, can be processed by collection vehicles if tied in bundles light enough to be lifted by one person and small enough to fit into the back of the truck. Other large quantity bulky items require special equipment for processing, such as vacuum leaf collection vehicles, leaf mulchers, wood chippers, and power brooms. (See *Guide Number 8, Citizen Support* for a discussion of special bulky item pick up service.)

In New York City, where abandoned automobiles have been a major problem, the mayor instituted a massive abandoned auto collection program in 1967. He had the Sanitation Department

junk automobile collection

Klamath County, Oregon

In 1966, Klamath County, Oregon, undertook a pilot program to see what could be done about the growing problem of old junk automobiles. The Board of Commissioners contracted with an auto press firm, which moved into one of the dumps. As soon as operation began, a news campaign was started. All news media, especially the local paper, publicized the program, and people in the area were urged to bring in their junk cars.

When the first community was cleaned up, the operation moved to another disposal site and subsequently into the City of Klamath Falls, where the county road department was used to help collect old cars. The city also cooperated and hauled "junkers" from lots.

The county legal counsel prepared a "release and bill-of-sale" form which was required to be signed before the county picked up any autos on private property. In most cases, $3.50 was charged, but for large concentrations (40 cars or more) the fee per car was smaller. The fee did not cover the actual cost of picking up, releasing, and disposing of the cars, which ran about $10.50 per vehicle. Klamath County paid the difference. One county official said, "It would be worth twice the cost if necessary to continue the program. The people are all for the improvement it has made in the county."

After the pilot junk automobile removal program was successfully completed, the county reached several conclusions:

1. A countywide abandoned automobile removal program is feasible, possible, and practical.

2. Property values are enhanced.

3. Scenic values and health conditions are improved.

4. People show more pride in their neighborhoods when junk cars are removed.

5. Salvage, in the long run, may be of economic value.

To continue the program, the county would have to:

1) provide central locations for storing the cars;

2) press for legislation to help defray the cost—perhaps a state fee ($15) when the vehicle is first registered in the state; and

3) either subsidize the freight to scrap centers, obtain better freight rates, or form a cooperative with several counties to purchase the necessary compressing equipment to take care of area problems.

Now during one week each May, the county cooperates with various Chambers of Commerce and conducts a countywide auto clean-up program. Last year by working dump areas and a six-mile radius of the City of Klamath Falls, 2,515 cars were removed. This represents one car body for every 20 people in Klamath County.

pick up the vehicles after normal solid wastes collection work had been completed each week. In 1968, the city discontinued its own towing operation and contracted privately. Under the new private contract system, after determination has been made that a car is actually abandoned, it is collected and each car must be scrapped by the contractor, who pays the city a per car fee.

Klamath County, Oregon, has also inaugurated a year-round abandoned automobile collection and disposal program.

Sometimes special storage must be developed to fit the specific needs of the material. In some areas, liquid and semi-liquid wastes which cannot be accepted by the sewer system (such as chemicals and oils) are loaded directly into tanker vehicles to be transported to a disposal site equipped to accept such wastes.

long distance transportation systems

transfer stations

Transfer stations may be desirable when the distance or travel time from collection to disposal sites is great. Transfer is justified when it saves more in collection costs than transfer itself costs. Daily and seasonal variations in solid wastes delivery rates must

transfer station

Orange County, California

Orange County officials use three criteria in determining the cost of transfer: (1) the cost of haul to the transfer station; (2) the unit cost of operating, maintaining, and amortizing the transfer station and its facilities; and (3) the unit cost of transportation from the transfer station to the nearest landfill. Based on the Road Department's 1957 report, "Master Plan for Refuse Disposal," which discussed solid wastes facility needs, the Orange County Board of Supervisors decided that a series of transfer stations and landfill operation would provide the most economical solid wastes disposal system.

By 1968, Orange County operated three transfer stations geographically located in urban areas, handling about 1,700 tons of solid wastes daily.

Each station has the same basic design, consisting of a ground-level unloading dock, scale system, and fueling area. The dock, 146 feet long and 80 feet wide, has depressed ramps for the transfer trailers adjacent to the unloading dock. This area has space for four sets (a semi-trailer and pull trailer) of transfer trailers to be loaded at a time. Solid wastes from municipalities, private contractors, and commercial operators are weighed on a truck scale as each load is brought to the dock. Typical transfer station equipment consists of truck-tractors, transfer trailers, packer-loaders, .and a power broom. The function of the truck and trailer unit is to transport the solid wastes to one of the five county-operated sanitary landfills. The packer-loader (a grab bucket and mounted crane) is used to distribute and compact solid wastes in the transfer trailer, and the power broom (a street sweeper) is used to pick up any solid wastes which might be scattered during the transfer of solid wastes from the collection vehicles to the transfer trailers. When loaded, each truck pulls two trailers carrying nearly 22 tons of solid wastes.

Because the transfer stations are relatively near residential areas, each station has been landscaped with pine trees to make it attractive.

In 1961, the county Road Department re-examined the economics of transfer stations and concluded that transfer had remained economical even though labor and equipment costs had risen. Orange County considers its three transfer stations an essential part of its areawide solid wastes disposal program.

be recognized in transfer system design and cost. Good engineering studies will determine the economics of the best design.

There are two basic transfer station designs: those which load solid wastes directly into the long-haul vehicle and those which deposit wastes into a storage area before loading them into the long-haul trailer. Efficiency is gained when solid wastes are compacted into the transfer vehicle. Since compaction of almost any kind increases transportation efficiency, any additional compaction obtained at the transfer stations is probably worth the cost. Once the trailers are loaded, they are transported to the processing or disposal site. No solid wastes should remain at the transfer station at the end of the working day.

If the area served is large or has established several disposal sites, it may be helpful to have more than one transfer station location to shorten travel by collection vehicles. The City of Seattle has two large stations; King County has seven smaller, strategically located stations. (See Field Report in Guide Number 4, *Organization*, and also see "Checklist for Good Operating Practice for Transfer and Disposal Operations.")

other transport systems

Other methods of transporting solid wastes include railcars, pipes, and barges. Rail transport is being tested by the American Public Works Association (APWA) to determine its cost, advantages, and disadvantages. Barge transport is used in some communities with waterways. Experiments are also underway to develop pneumatic and flushing systems to transport solid wastes.

volume reduction and disposal methods

The sanitary landfill is presently the only true disposal method and is basic to any solid wastes program. Incineration is a volume reduction process and produces residues which should be sanitary landfilled. Open burning and open dumping are not solutions to the disposal problem. Feeding hogs garbage is a form of reuse. Compost is a form of processing organic wastes, such as garbage and paper, to form a humus-like soil conditioner. Such a recycling process may be incorporated in the system to handle a small percentage of solid wastes. But local governments should not base any solid wastes management system predominantly on a salvage or compost program.

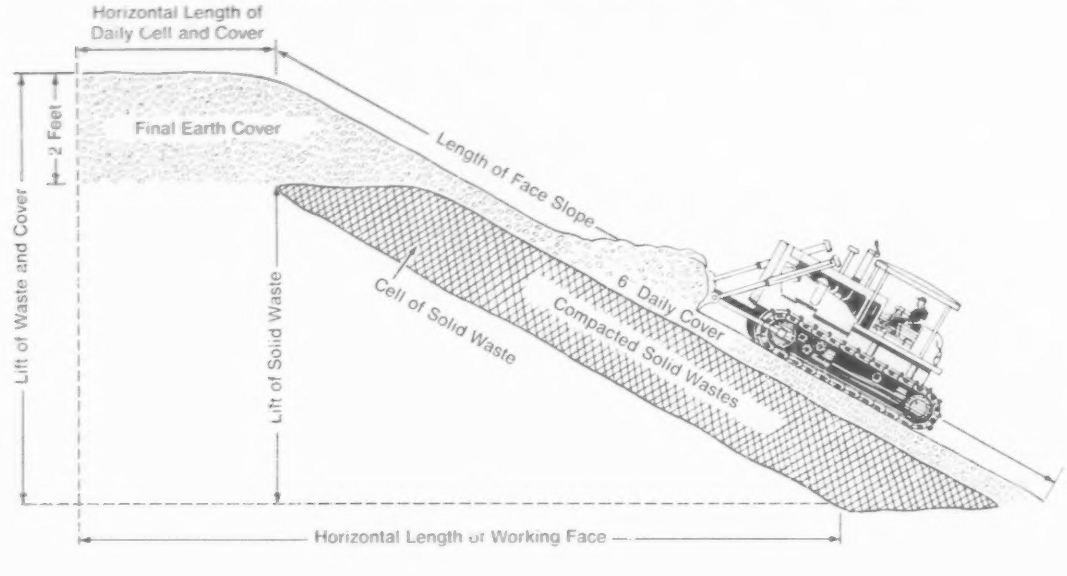
sanitary landfill

Sanitary landfill frequently is a versatile and economical disposal method. Almost any solid wastes can be disposed of in a sanitary landfill, and otherwise unusable land can often be reclaimed for community use. Major elements in the sanitary landfill process are proper placing of refuse, effective compaction, and adequate cover (see Figure B).

According to the American Society of Civil Engineers:

> Sanitary landfill is a method of disposing of refuse on land without creating nuisances or hazards to public health or safety, by utilizing the principles of engineering to confine the refuse to the smallest practical area, to reduce it to the smallest practical volume, and to cover it with a layer of earth at the conclusion of each day's operation, or at such more frequent intervals as may be necessary.

FIGURE B: **sectional view of a sanitary landfill**


Horizontal Length of Daily Cell and Cover
Lift of Waste and Cover
2 Feet
Final Earth Cover
Length of Face Slope
Lift of Solid Waste
Cell of Solid Waste
6 Daily Cover
Compacted Solid Wastes
Horizontal Length of Working Face

No on-site burning should ever be permitted at a sanitary landfill. A sanitary landfill can be made operational in less time than an incinerator or compost plant.

Determining Land and Equipment Needs. The amount of land needed for sanitary landfill operation is based on the amount of solid wastes to be landfilled. The amount will vary with the seasons, and will be greater when local government disposes of commercial, industrial, or agricultural solid wastes on a regular basis. There are no reliable formulas to determine residential, commercial, agricultural, and industrial waste amounts, so a *careful study must be made* of the solid wastes generated in the area that will be using the sanitary landfill. Weight is the most reliable basis since volume is a relative measure.

Roughly, one acre of land with a 15-ft compacted lift of solid wastes will accommodate a population of 10,000 for a year. If additional lifts can be placed over the initial lift, the land area requirement can be reduced.

Sanitary landfill equipment needs are based primarily on the daily tonnage of wastes to be landfilled. It is best to use scales at the landfill to provide the necessary data to determine daily tonnage. Scales also provide an equitable basis for fees. In a small operation, one tractor with a bucket loader (and a dump truck if cover material must be transported) can operate very well; a large operation may require several pieces of compacting and earth moving equipment. (See Figure C showing equipment needs

FIGURE C: AVERAGE EQUIPMENT REQUIREMENTS

Population	Daily tonnage	Equipment			Accessary*
		No.	Type	Size in lbs.	
0 to 15,000	0 to 40	1	Tractor crawler or rubber-tired	10,000 to 30,000	Dozer blade Front-end loader (1 to 2 yd) Trash blade
15,000 to 50,000	40 to 130	1	Tractor crawler or rubber-tired	30,000 to 60,000	Dozer blade Front-end loader (2 to 4 yd) Bullclam Trash blade
		*	Scrapper Dragline Water truck		
50,000 to 100,000	130 to 260	1 to 2	Tractor crawler or rubber-tired	30,000 or more	Dozer blade Front-end loader (2 to 5 yd) Bullclam Trash blade
		*	Scraper Dragline Water truck		
100,000 or more	260 or more	2 or more	Tractor crawler or rubber-tired	45,000 or more	Dozer blade Front-end loader Bullclam Trash blade
		*	Scraper Dragline Steel wheel compactor Road grader Water truck		

*Optional. Dependent on individual need.

Source: U.S. Department of Health, Education and Welfare, Public Health Service, National Center for Urban and Industrial Health, Solid Wastes Program Publication Number 1792 **Sanitary Landfill Facts** (Washington: Government Printing Office, 1968), p. 17.

In this sanitary landfill, solid wastes are covered continuously during the day and then given a final cover at night. The result is that only a small working face is evident at one time.

based on tonnage of wastes to be filled and population served. Also see total cost bidding in *Guide Number 6, Financing.*)

Site Suitability. Selection of a site involves consideration of topography, population, accessibility, hauling distance, cost, time-in-motion, pollution potential, cover material, proximity of residences, citizen reaction, and ultimate usage. Sites should be chosen which will meet anticipated needs for at least the next ten years, but preferably for a 20- to 30-year period. This may mean selection of several sites, each having a life of from three to five years. Sites worth considering for use as sanitary landfills include gullies, ravines, eroded areas, marshlands, strip mines, gravel pits, and flat land.

Generally, the larger the parcel of land, the greater the economies to be gained, presuming the distance to the site is not unreasonably difficult to travel. Where disposal sites are distant, transfer stations may be required. Engineering consultants are usually enlisted to find potential landfill sites, evaluate their suitability, and determine whether transfer station operation would bring economies. (See *Guide Number 9, Personnel,* for more on using consultants.) If there is standing or flowing water on the land, it must be permanently diverted before beginning the fill.

A qualified soil specialist or geologist should check the topographic, soil, and geologic conditions to insure protection of the ground water. Subsoil should be impermeable. If not, adequate soil must separate the bottom of the waste fill from the highest known ground-water level. Proper surface drainage should be provided to minimize entry of surface waters into the landfill proper. Surface drainage must be consistent with the surrounding area so the finished construction will neither interfere with proper drainage on adjacent lands nor concentrate run-off water on adjacent areas. To allow normal surface drainage and to minimize erosion, the completed fill should have at least 1 per cent slope, and be seeded to promote stabilization of the cover.

Availability of workable earth is an important factor in operating cost. If it cannot be excavated at the site, or brought in from nearby road construction or other sources, it may have to be purchased. Hauling and purchase can raise costs 25 to 50 per cent or more. The cover material should compact well and be applied thickly enough to prevent cracking and exposure of the filled wastes. In cold climates, cover material must be excavated

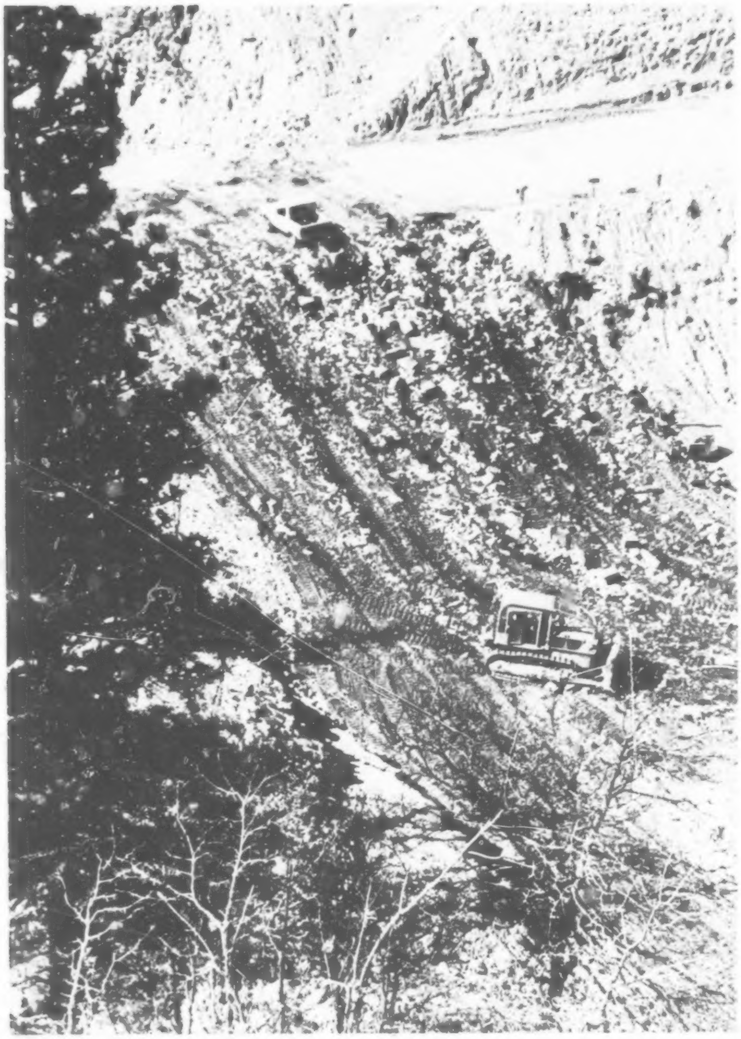
multiple functions of sanitary landfill

San Bernardino County, California

The solid wastes disposal program for San Bernardino County, California, must allow flexibility in the selection, construction, and operations of its eight sanitary landfill sites. The county has five basic environments—low desert, high desert, alluvial valley, foothill, and mountain—and elevations ranging from 14,494 feet above to 282 feet below sea level. Each elevation has its own soil, water, vegetation, and atmospheric characteristics. When these conditions are added to considerations of population, location, and transportation, the construction of a sanitary landfill becomes a complex problem.

The San Bernardino County Refuse Disposal Department works closely with the regional water quality board and flood control district. Many county sanitary landfills fulfill a dual function since they are part of flood control or watershed *management projects. For flood control projects, a dyke or bulkhead of earth, building materials, or cement is constructed on the edge of a river prone to flash flooding. Behind the dyke or bulkhead, a sanitary landfill is operated to build the flood lands above levels that would otherwise be inundated. In one instance, the landfill has been built to a considerable height and serves as a dyke to protect a sewage treatment facility and to shield the plant from a nearby residential area.*

In another operation, the county is improving a watershed area by filling a sharp cut in some foothills. By filling the cut and diverting runoff, it is hoped that more water can be retained in the hills. When the landfill has been completed, the site will be turned into a park.



In California and other mountainous states, canyons and ravines are frequently used as sanitary landfill sites. Though the working faces are steep, such areas usually provide large fill areas and can be reclaimed for various uses.

before the ground freezes. However, freezing can be delayed by adding a mulch covering.

Before implementing a sanitary landfill operation, it is necessary to determine the final use of the land. This affects the final contour and whether all the land will be filled. Maps should be made of the present contour and property lines, and of the projected completed fill.

As wastes decompose, settling occurs. The more wastes were compacted originally, the less settling. Buildings should not be erected on filled land unless proper foundation conditions are provided.

In Waukegan, Illinois, the city's contractor is filling swampland to make it suitable for an athletic field and park. The unfilled high ground will be used to support a school building (see Field Report in *Guide Number 8, Citizen Support*).

One of the greatest problems in obtaining a site for a sanitary landfill is overcoming public opposition, particularly if a previous landfill has been improperly operated or if dumps exist. Equipment operating noise at a site is comparable to that at any excavation involving heavy equipment. Gases, mostly methane and carbon dioxide, are produced by waste decomposition. Since the sanitary landfill encloses solid wastes in cells, the chance for spontaneous combustion or gas explosion is reduced. If fire should occur, it can be more easily controlled than a fire in an open dump since the oxygen supply in the cell is limited. Moreover, the danger of fire in a sanitary landfill is much less than in an open dump.

Evaluation. The following is a summary of the advantages and disadvantages of the sanitary landfill solid wastes disposal method.

Sanitary Landfill

ADVANTAGES	DISADVANTAGES
1. Where land is available, the sanitary landfill is usually the most economical method of acceptable wastes disposal.	1. In highly populated areas, suitable land may not be available within economical hauling distance.
2. The initial investment is low compared to that of other disposal methods.	2. People often confuse sanitary landfills with dumps. Location of sanitary landfills in residential areas can result in extreme public opposition.
3. A sanitary landfill is a complete or final disposal method, compared to incineration and composting where items such as residue and unusable materials require further disposal.	3. A completed landfill will settle and require periodic maintenance.
4. A sanitary landfill can be put into operation within a short period of time.	4. Special design and construction must be utilized for buildings constructed on completed landfill because of the settlement factor.
5. A sanitary landfill can receive most types of solid wastes.	5. Without proper planning, methane, an explosive gas, and the other gases produced from the decomposition of the wastes may become a hazard or nuisance factor and interfere with the use of the completed landfill.
6. A sanitary landfill is flexible: increased quantities of solid wastes can be disposed of with little additional personnel and equipment.	6. Potential for ground-water pollution exists if the landfill is not properly planned, designed, and operated.
7. Submarginal land may be reclaimed for uses such as parking lots, playgrounds, golf courses, and airports.	

Sanitary landfill is the most inexpensive disposal method known today. It is especially suitable for rural areas, mountainous areas, or areas which have an air pollution problem. In communities where land is limited or extremely expensive, this method may not be suitable unless a cooperative agreement can be reached with neighboring jurisdictions. A properly operated sanitary landfill produces no objectionable odors, vector problems, or blight.

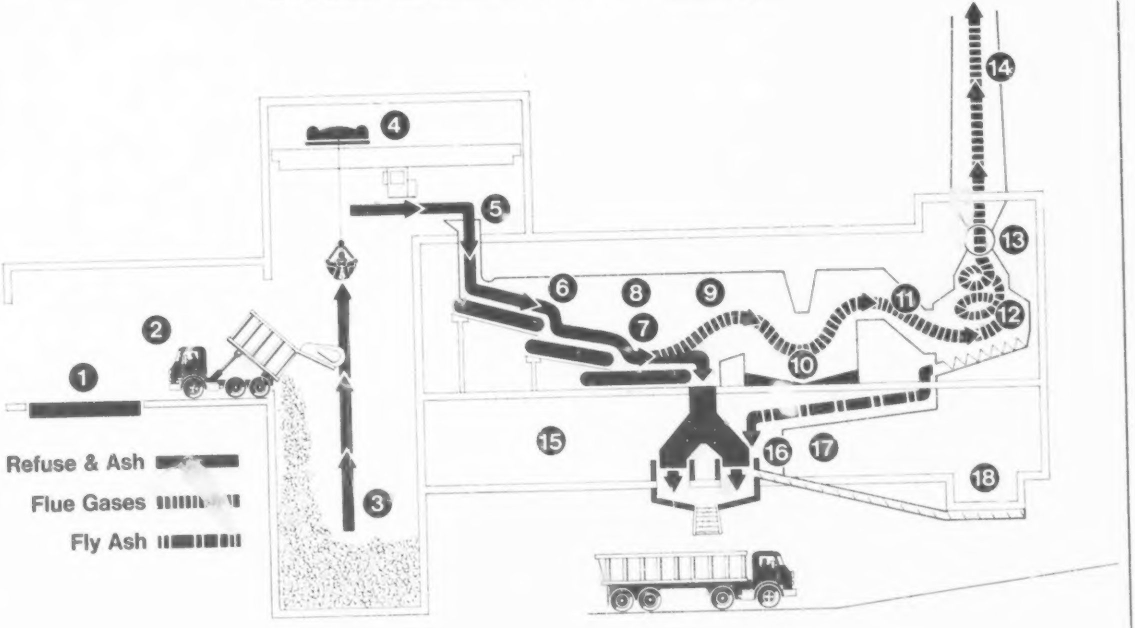
and is especially suited to the reclamation of marginal land. A sanitary landfill is basic to any other solid wastes processing operation since all produce some materials which must be sanitary landfilled.

incineration

Incineration is a combustion process by which materials are reduced primarily to carbon dioxide, other gases, and ash. By this method, the volume of solid wastes is reduced, conserving the life of the necessary companion sanitary landfill. Incinerators must be designed and operated to meet stringent air pollution controls. An incinerator is normally rated on the number of tons it has the capacity to burn in a 24-hour period or in tons per hour.

The Plant and the Process. The basic parts of an incinerator plant are the building, scales, storage pit, bucket and crane, charging hopper, furnace (which includes grates, primary and sec-

FIGURE D: basic incinerator design



1. Scales
2. Tipping Floor
3. Storage Bin (Pit)
4. Bridge Crane
5. Charging Hopper
6. Drying Grates
7. Burning Grates
8. Primary Combustion Chamber
9. Secondary Combustion Chamber
10. Spray Chamber
11. Breeching
12. Cyclone Dust Collector
13. Induced Draft Fan
14. Stack
15. Garage - Storage
16. Ash Conveyors
17. Forced Draft Fan
18. Fly Ash Settling Chamber

A bucket and crane scoops up mounds of solid wastes from the storage pit of this working incinerator.

ondary combustion zones, and gas cleaning chamber), residue conveyor, air pollution controls, stack, and quench water controls (see Figure D).

Most solid wastes collection is carried out five or six days a week during daylight hours. It is usually more economical to operate an incinerator on a 24-hour basis or at least until all wastes are burned each day. To permit even operation of the incinerator during the remaining hours of the plant operating day, a solid wastes storage area or pit must be provided at the incinerator plant. Thus, solid wastes can be fed into the charging hopper as needed and vehicles can be emptied conveniently.

For good design, storage of at least 30 hours' capacity should be provided, based on the rated full capacity of the plant. Ideally, the plant should be operated so that the pit is completely emptied daily, and not less than once weekly for safe operation. Plant operating shifts and hours of furnace operation should be planned around this schedule. If the pit is not emptied weekly, material

incineration

Montgomery County, Maryland

Since July, 1965, Montgomery County, Maryland, has operated a $4,828,799 incinerator 24 hours a day, six days a week. The plant currently has three furnaces with a capacity of 1,050 tons of solid wastes per day, and $995,000 was budgeted for fiscal year 1968 to add a fourth furnace, increasing the capacity to 1,400 tons per day.

County residents in the urban service area pay $4 per month for twice-a-week collection. This fee includes disposal. Other disposal service users, non-taxpaying government agencies such as schools, are charged on a per-ton basis. Two 60,000-pound platform scales are installed at the entrance to the unloading area.

Sixty-two men are employed at the plant in three shifts. The men are provided uniforms, a lunchroom, lockers, and shower facilities. Offices are provided for the plant supervisor and foremen, the scale house operation, and for the clerical staff to issue monthly statements and relay complaints.

The county program is operated mainly by the Bureau of Refuse Collection and Disposal of the Department of Public Works, but the Department of Licenses and Inspection checks and licenses private collection vehicles.

on the bottom will begin to decompose, which produces odors and increases the danger of pit fires by spontaneous combustion.

Because the percentage of garbage in refuse has decreased markedly in recent years, the need for auxiliary fuel to fire an incinerator is minimal or unnecessary.

the importance of temperature

The rate of combustion is directly related to the composition of the solid wastes, the burning surface, and the amount of oxygen supplied both over and under the fire. The temperature of combustion will vary considerably because of the wide range of heat values inherent in the mixture of wastes to be incinerated. To burn the materials thoroughly, furnace temperatures must be maintained between 1500° and 1800° F. Equipment is essential to record temperatures and measure oxygen supplies. When furnace temperature is too high (over 1800°) deposits (called clinker and slag) adhere to grates and refractories (furnace walls and ceiling linings). These deposits can cause serious damage by jamming grates and causing the refractory to wear, melt, and cave in. Periodic maintenance is essential to remove these deposits. (For detailed information on refractory types, see APWA *Municipal Refuse Disposal*, listed in bibliography.)

After combustion, gases and particulate matter pass into an air pollution control device (such as a baffle, wet scrubber, cyclone collector, or electrostatic precipitator) designed to remove them. Any remaining gas, steam, or particulate matter is drawn by induced draft fans or natural ventilation up the refractory-lined stack and into the atmosphere.

After combustion, residue and ash remaining in the primary combustion zone reach the end of the grates, then fall into a water bath to be quenched and cooled. Quench waters contain many dissolved organics and solids, and require treatment prior to reuse or discharge. If not recirculated, waters should be treated and discharged into a sanitary sewer. Residue is then taken to a sanitary landfill.

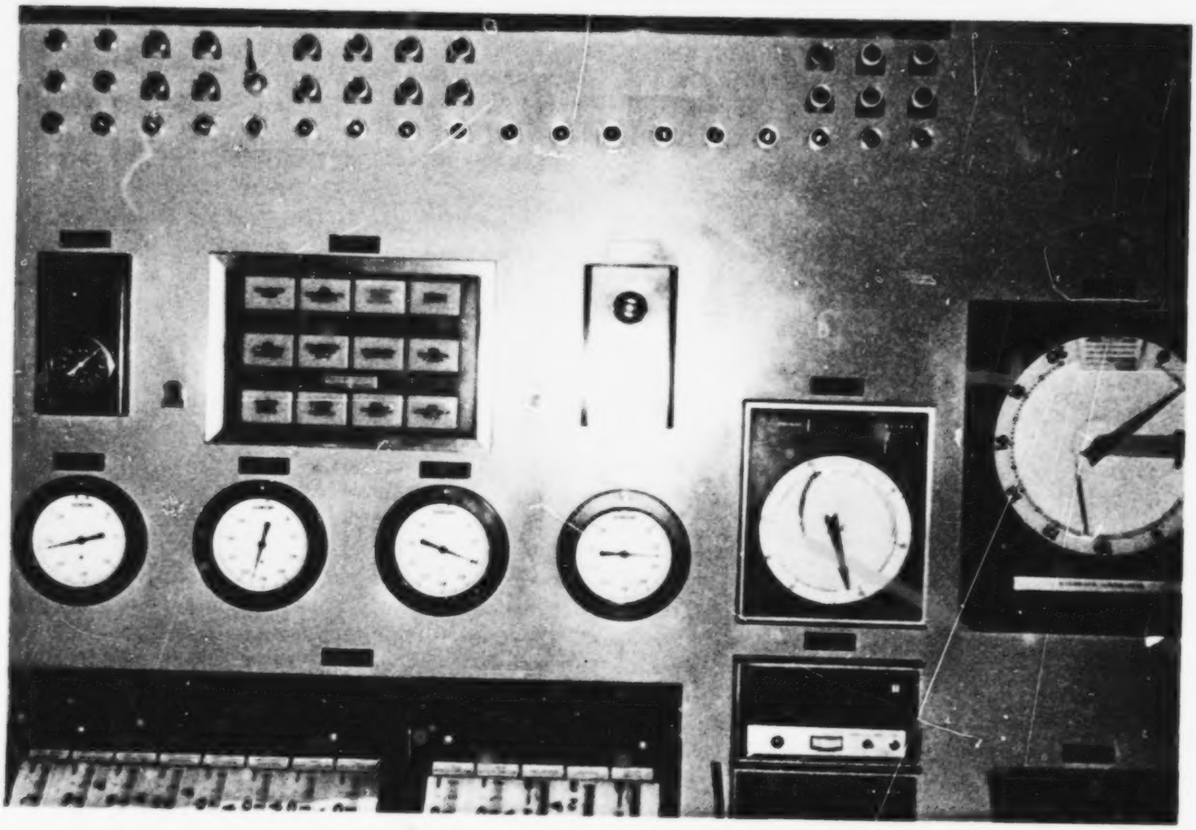
Consultant Services. An incinerator plant is an extremely complex piece of equipment. Since most local government engineering staff members do not have the specialized knowledge to plan and design an incinerator plant, a consulting engineer is usually retained.

The design should be prepared by one engineering consultant so that all the component parts will be coordinated. The design consultant should be retained from the initial drawing of the plans to the completion of the plant. This means that the consultant should be responsible for seeing that the plant can be and is operated for a continuous period of six months or more at design cacapity by plant personnel trained by equipment manufacturers. (For a detailed discussion of using consultants, see *Guide Number 9, Personnel.*)

Evaluation. An incinerator plant design should be simple, functional, economical, and attractive. This includes the equipment not usually housed within the main building, such as settling and cooling ponds for recirculating water. The plant should operate well at full design capacity with as little maintenance and repair as possible. It should be nuisance free, and it must have a sanitary landfill.

A NACORF survey of cities and counties using incineration uncovered some unacceptable shortcuts which had been "sold"

This photo shows some of the highly sophisticated controls used to keep the Miami County, Ohio, incinerator operating as economically, safely, and efficiently as possible.



to officials. Many of these shortcuts were part of "package-deal" incinerators offered as turnkey operations. This reinforces the need for public officials to secure competent engineering advice in choosing the incineration system.

Incineration is an effective volume reduction method where land appropriate for sanitary landfill is limited, and money and water are abundant. Incineration can handle about 80 per cent of typical urban solid wastes and reduce weight at least 70 per cent if the plant is operated properly. The remaining residue, along with non-incinerable materials, must be sanitary landfilled. With this system, much less land is needed to sanitary landfill wastes.

The cost of incineration is high. Construction cost (including elaborate air pollution control devices) runs about $7,000 to $12,500 per ton capacity of the plant. Operating costs run about $5 to $9 per ton plus amortization. These high costs are spread among maintenance, power, personnel, and administration. Incineration equipment must be replaced at least every 15 to 20 years.

Skilled operators and continued maintenance are essential. It is foolish to invest a million or more dollars in a plant and then fail to staff it with trained people at adequate salary.

Incineration

ADVANTAGES	DISADVANTAGES
1. Land requirements for the plant are small.	1. The plant is expensive to construct and operate.
2. Operation is not dependent upon weather conditions.	2. Improper operation or inadequate equipment produces air and land pollution.
3. It can be put in urban industrial areas, reducing haul distance.	3. Highly skilled personnel are essential.
4. It provides volume reduction.	4. Continuing maintenance is a necessity.
5. It reduces landfill requirement for solid wastes disposal.	5. Disposal of residue must be provided.
6. It produces a stable, odor-free residue.	

composting

The Plant and the Process. Composting is a method of handling and processing solid wastes to produce as the end product a humus-like material which may be used as a soil conditioner. The process requires separation of non-compostable materials which must be disposed of by other means. Technically, composting is biological degradation of organic matter under controlled conditions of aeration, temperature, and moisture.

Since the organisms necessary to make compost accompany almost all solid wastes, most materials begin to decompose within a few hours. Garbage degrades quickly; paper, cloth, wood chips, and leather less quickly; most plastics and rubber degrade very slowly if at all.

Composting as generally used in discussions of commercial and municipal processes refers primarily to aerobic decomposition (in the presence of oxygen). However, composting of solid wastes

FIGURE E: 1968 STATUS OF U.S. COMPOSTING OPERATIONS

Location	Company	Process	Capacity (Tons per day)	Status
Altoona, Pa.	Altoona FAM, Inc. Fairfield Engr. Co.	Fairfield-Hardy	45	Operating
Boulder, Colo.	Rich Land Co.	Windrow	100	Closed
Elmira, N.Y.	National Organic Corp.	Windrow	100	Construction stopped
Gainesville, Fla.	Gainesville Metropolitan Conversion Corp.	Metro	200	Operating for research purposes
Houston, Texas	Biochemical Sales, Inc.	Snell	300	Closed
Houston, Texas	Metropolitan Waste Conversion Corp.	Metro	360	Operating
Houston, Texas	National Organic Corp.	Windrow	300	Construction delayed
Johnson City, Tenn.	PHS-TVA Cooperative Program	Windrow	50	Operating for research purposes
Largo, Fla.	Peninsular Organics, Inc.	Metro	50	Closed
Mobile, Ala.	City of Mobile	Briquetting	300	Operating (with windrows)
Norman, Okla.	International Disposal Corp.	Naturizer	35	Closed
Phoenix, Ariz.	Arizona Biochemical Company	Dano	300	Closed
Sacramento, Calif.	Dano of America, Inc.	Dano	40	Closed
St. Petersburg, Fla.	International Disposal Corp.	Naturizer	105	Closed
San Fernando, Calif.	International Disposal Corp.	Naturizer	70	Closed
Springfield, Mass.	Springfield Organic Fertilizer Co.	Frazer-Eweson	20	Closed
Williamston, Mich.	City of Williamston	Riker	4	Closed
Wilmington, Ohio	Good Riddance, Inc.	Windrow	20	Closed

may take place in the absence of oxygen (anaerobically). Odors produced by the aerobic decomposition process are less objectionable. The aerobic process is quicker and achieves higher temperatures, thus guaranteeing a relatively germ-free product, free of live weed seeds and insect larva. The anaerobic process is slow, smelly, and does not achieve temperatures high enough to destroy all pathogens. Anaerobic decomposition also produces noxious gas by-products such as hydrogen sulfide.

In most processes, it is difficult to control the oxygen balance throughout the wastes. Thus, it is possible to have aerobic and anaerobic decomposition taking place simultaneously in different parts of the wastes.

One commercial method is by windrow (pile) composting in which the processed wastes are placed in long rows on concrete, asphalt, or the ground. The rows are mechanically turned about once a day for the first week, then twice a week for about a month.

Some elaborate systems mechanically mix, agitate, and aerate the composting material in enclosed units. This speeds the process so that relatively inert material can be produced in as little as five to seven days.

commercial composting with salvage

Metropolitan Waste Conversion Corporation,
Houston, Texas

In operation since November, 1966, Metropolitan Waste Conversion Corporation converts solid wastes into salvageable items and compost products. The Metro Waste operation consists of removing all salvageable and non-compostible materials, grinding what is left, and then subjecting it to a digesting process which converts it into organic compost.

The process begins when trucks dump waste materials into a continuous conveyor which moves onto a sorting station where such non-compostible materials as ceramics, rubber, glass, and nonferrous metals are removed by hand. Ferrous metals are removed by powerful magnets and sold as scrap metal. Approximately 15 per cent of the material, such as corrugated cardboard, rags, and newsprint, is salvaged, bailed, and sold. The remaining material moves to two sets of grinders and is then mixed with thickened sewage sludge and placed in a specially designed digestor for six days. It is then reground and packaged for distribution.

Since the present market for compost is seasonal (spring and fall) large quantities must be stored at the plant site, usually outdoors. These stock piles have a slightly musty odor that usually cannot be detected more than several hundred feet away. However, some people object, claiming that compost was "garbage" when it entered the plant so it must be "garbage" even after processing. The plant, located in an industrial park and surrounded by residential communities and small businesses, has extended an open invitation to homeowners and businessmen to visit. More than 100 persons have done so. Invariably, they are impressed by its operation and convinced that the plant and process does not constitute a health hazard, as is frequently rumored.

Metro Waste is now working with fertilizer companies to market the product as a blend of organics and chemicals, experimenting with the use of compost instead of wood fibers for hydromulching, and collaborating with a paper company on the use of compost for reforestation programs. To determine proper application amounts and frequency for crops such as cotton, citrus, soybeans, rice, and vegetables, Metro Waste is working with farmers, universities, and county agricultural agents. It also works with a biological laboratory to insure constant quality control and safety of the compost material.

Metro Waste's Houston plant, costing approximately $2 million, has a rated capacity of 360 tons per day. The compost product, after final grinding, sells for about $12 per ton in bulk with no upgrading. The company pays rent on the land and taxes on the building and machinery in Houston, and is treated as any other industry by the city. Original plans for the Houston plant called for a work force of 35 persons including the manager, but Metro Waste found it could conduct an efficient and satisfactory operation with 29 men.

The City of Houston, Texas, has developed a balanced system for wastes disposal by integrating the three acceptable solid wastes processing methods—incineration, composting, and sanitary landfill. The city operates an incinerator and a sanitary landfill. It also contracts with the Metropolitan Waste Conversion Corporation to compost up to 360 tons of solid wastes daily, for which the city pays $3.87 per ton. With these three processing methods, the city has alternatives available in the event that one of the disposal sites must be temporarily closed down.

After conversion into a brown humus-like material, further refining may be necessary to remove undesirable particles (such as metals, glass, ceramics, plastics, rubber, and leather), depending on final use.

Evaluation. The promise that the compost will be sold and thereby pay for the cost of the process is seldom realized. There is no automatic market for compost. The rate of plant failure speaks for itself (see Figure E).

Developing a market may not mean selling compost for profit. It may mean finding someone who will take it free in large quantities on a reliable and continuous basis. The local government may be able to use most of it to maintain grass, trees, and shrubs in city and county parks and along highway median strips and shoulders. Some local governments give it to farmers. In Houston, experiments are underway to determine whether compost can be used for animal feed. Failure to find a reliable end use for the product means that government will have to foot the bill to sanitary landfill the compost as well as its residue.

There is a widely held misconception that compost by itself is a fertilizer. Compost is only a conditioner used to make soil more manageable and increase its ability to hold moisture.

Composting finds its greatest application in agricultural communities. Communities should be careful to avoid the usual pitfalls when considering the compost process. Shysters sell bottled enzymes "to stimulate action to make solid wastes compost." Since bacteria are already present, the action starts whether enzymes are added or not. Glass, metals, tin foil, and other solids will not compost and must be removed; foreign material in the compost will greatly affect the ability to find a use for the end product. Since all wastes cannot be composted, something must be done with the other (inorganic) wastes. They must either be landfilled, sold as salvage, or given away. Sanitary landfilling this material is the only continuously reliable method since the other systems depend heavily on a fluctuating market demand for the used item, and most inorganics do not incinerate well.

Few compost plants operate economically. A private experimental plant in Houston has had a short-term successful record. This plant might be described as a waste utilization plant. Much

Though the recycling and reuse of solid waste materials is still in its infancy, some operations are currently in progress. Here tiny bits of metal reclaimed from junk autos are loaded into railroad cars for transport to plants where they may be melted down and used again in new products.

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of the salvage is reprocessed by sister companies and the port provides economical access to overseas markets. The firm sells plastics to Japan; paper for pulp, cans for copper, and glass for reflective paints and for reuse in glassmaking.

Although recycling usable materials should be a national long-range goal, it is unwise to base an entire solid wastes management system on recycling wastes unless a *guaranteed* market is developed in advance. The payment for the recycled goods must be at least sufficient to meet the additional costs of extra manpower for sorting materials and extra time for transporting the material to the user, and for sanitary landfilling the remaining solid wastes. Local governments must consider composting as a treatment or process prior to disposal. They must be prepared to pay a reasonable price for this operation.

Composting

ADVANTAGES

1. Compost can be used as a soil conditioner.
2. Composting is a recycling method.
3. Composting is a volume reduction method.

DISADVANTAGES

1. There are presently few outlets for the compost and the salvaged materials.
2. All wastes will not compost.
3. A sanitary landfill is still needed to dispose of those materials which are not salvaged or will not compost.

checklist for transfer, processing, and disposal operations

— All-weather access and egress roads
— Dust control measures
— Posted regulations
— Employee facilities — washrooms, lunchrooms, lockers
— Scale house and weigh station
— Fenced grounds
— Designated place and container for wastes to be received after hours at the gate
— Landscaping and litter control
— Employee safety program
— Fire fighting equipment available
— No open burning practiced
— Communications
— Adequate screening
— Banning of scavenging
— Efficient recordkeeping

This dump, operated by a Michigan city, is not only an eyesore and a health hazard, but also situated on a flood plain, thereby creating pollution.

the dump

What Constitutes a Dump? The Bureau of Solid Waste Management uses the word "dump" to describe any site where solid wastes are left uncovered for a period of more than a day. Although it is a hazardous and unsatisfactory operation, it is the most widely used practice. A dump also is an accumulation of wastes from one or more sources at a central disposal site under little or no management.

Dump operation seems inexpensive; few operators are needed and maintenance costs are low. Actually, the hidden costs of a dump are rodent and insect infestation, poor community relations, excessive demand on health and fire department time, stench, air and water pollution, and land value depreciation.

Cleaning Up an Old Dump. An old dump can be transformed into a sanitary landfill by adopting sanitary landfill operating standards. Before bringing additional solid wastes to the disposal site to be sanitary landfilled, several steps must be taken:

1. Thoroughly extinguish all fires.
2. Exterminate all rats and other vectors. (If this is not done, these vectors and vermin will invade the surrounding community. Residents will believe the new sanitary landfill is the cause.)
3. Compact all solid wastes, and if practical consolidate them into limited areas.
4. Cover the dump with compacted earth.

Kenilworth disposal site in Washington, D.C., once the nation's most notorious open burning dump, ceased burning operations February 15, 1968. After extinguishing all fires, exterminating all vectors, and compacting the wastes, the tons of accumulated charred wastes were covered. By April, a sanitary landfill was in full operation.

progress and problems in cleaning up dumps

City of Beaufort and Beaufort County, South Carolina

"Beaufort has made more progress in taking care of its solid wastes than any other county in the state. It is now correctly disposing of about 50 per cent of it, which puts it a giant step ahead of most counties." This assessment of the situation in Beaufort County, South Carolina, was made by a representative of the Environmental Sanitation Division of the state Board of Health, which has surveyed the status of solid wastes management in all of South Carolina's 46 counties.

The transition from open dumps and burning began in 1956, largely through the efforts of the county health department's chief sanitarian, who was aided by the state health department.

Survey results and recommendations were presented to the city council, which liked the idea of ending open dumping and burning and instead operating a disposal site which could eventually be used for park and recreation purposes. Other economies of the proposal were particularly attractive. It was estimated that $10,000 per year might be saved by eliminating the 8-mile haul to the local dump, and instead landfilling the wastes on property within the city limits. An ordinance regulating the handling and collection of "garbage" and "waste matter" was adopted.

Members of the county Board of Directors (governing board) proved equally receptive to proposals for cleaning up Beaufort County. The board's public service committee prepared guidelines on "Recommended Standards for Sanitary Landfills." Program direction was assigned to the county supervisor of roads and bridges, who gave his full support to the use of county equipment and personnel for the maintenance of disposal sites.

The county now maintains three sites, with long-range plans calling for 11 strategically located sites. A crawler tractor with front-end loader, run by a full-time operator, is transported between the sites to compact wastes in trenches and apply daily cover.

The local terrain is dotted with natural pits and depressions; owners are often anxious to have the land improved. Such land is usually leased to the county for $1 per year to be filled. During the first seven years, two pits were reclaimed through city-county cooperation and are presently being used for ballfields and other recreational activities.

Beaufort County faces special industrial waste problems: pesticide container and wastes disposal; liquid wastes from fertilizer plants; toxic wastes from soybean processing; culls, peels, and seeds from canneries and truck farms; and wastes from local fisheries. Beaufort is currently trying new techniques to improve disposal of these by-products.

Though solid wastes problems in Beaufort County have by no means been solved, the county finds itself well ahead of most communities its size across the country (population in excess of 45,000). Local officials are actively seeking guidelines and are receptive to suggestions which might provide solutions to their problems. Although limited by inadequate funds and staffing, they are attempting to implement a satisfactory, workable program.

feeding hogs garbage

Feeding hogs uncooked garbage is prohibited by every state and by federal law. Yet some communities continue to feed hogs raw garbage. A 1967 U.S. Senate Committee on Agriculture Report on the Federal Meat Inspection Act cites a World Health Organization report stating that in the United States one in six persons has trichinosis—this is the highest rate in the world.

To insure necessary and adequate protection of people and hogs, pathogenic organisms must be destroyed. This requires that food wastes be cooked at 212° F for 30 minutes, which is difficult to enforce.

Although it may be convenient for the hog farmer to have a garbage route to get swill for swine, allowing farmers to have their own garbage routes requires the separation of garbage and refuse (which is inconvenient for the homeowner), and in the long run endangers health. As of July 1, 1968, Wisconsin completely outlawed feeding any type of public or commercial garbage to swine. Since most places fail to prepare garbage properly, other states and local governments must enact this prohibition.

This picture of hogs feeding at an open dump in a Southern state is a situation found in states across the country, though not usually in such blatant form.

summary

Every solid wastes management system must be designed to meet the particular needs of the community to be served.

To design a collection system, it is necessary to examine the types of storage containers and collection equipment, route and crew organization arrangements, manpower availability, topographical conditions, degree of homeowner participation feasible, and types and amounts of solid wastes generated.

To design a disposal system, environmental conditions (air, water, and land), cost considerations, and public attitudes must be evaluated to select the method or combination of methods most appropriate. Although the community will need to rely on sanitary landfill for final disposal of solid wastes, incineration and/or composting may be additional processing steps used.

Methods of processing or disposal which cause pollution, such as dumps, open burning, flue-fed burners, and conical burners, are not satisfactory and should not be part of a solid wastes management system. The conditions under which hogs may be fed commercial garbage legally and safely are widely disregarded and difficult to enforce; therefore, local government should not consider feeding hogs garbage to be part of the local solid wastes management system.

Good solid wastes management requires that collection, processing, and disposal be coordinated. In a large solid wastes management system, coordinating collection and disposal operations through the use of transfer stations may bring economies and increased efficiency. Coordination is also essential between public and private operation.

Another area where coordination is necessary is that between local government and the citizen. The citizen must know what is expected of him to make the solid wastes management system effective. In addition, there is a relationship among the amount of citizen participation required, the degree of service provided, and the cost of the service. For example, set-out/set-back collection is more expensive than curb service because the collection crew must do more work. With curb service, the citizen must participate by carrying his solid wastes container to the curb and back on collection days. Another illustration of this relationship is the difference in cost between having local government provide pickup service as opposed to having the citizen bring bulky items directly to the disposal site.

In the operation of a comprehensive solid wastes management system, the management of industrial and agricultural wastes and hard-to-handle items such as abandoned automobiles should not take a back seat to the collection and disposal of residential and commercial solid wastes. In addition, all services should be performed to meet the highest standards of environmental sanitation and personnel safety. Good solid wastes management is an asset to a modern community. The development of solid wastes technology is rapidly expanding just as the types and amounts of solid wastes being produced are changing and increasing. Therefore, the solid wastes management system local government selects today must be flexible enough to adopt tomorrow's technology to meet tomorrow's needs.

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6 financing

financing

introduction

The solid wastes problem reflects years of financial neglect. Open and burning dumps throughout the United States are ample testimony of the unwillingness of local governments to finance a properly operated areawide solid wastes management system. An areawide system involves many decisions on methods of operation; most, if not all, of them depend on financial considerations. Funds must be found for regulation, storage, collection, transportation, processing, and disposal. Though responsibility for regulating an areawide program rests with local governments, actual operation can be handled by local government, private operators, or both.

Ultimately the citizen pays for any program, either as a customer being charged a fee for direct service or as a taxpayer. In either event, financial needs depend on several factors: (1) type of service to be provided—collection and/or disposal; (2) level of collection service—once or twice a week, and street or backyard pickup; (3) type of customer to be served—agricultural, residentialtial, commercial, industrial; and (4) method of processing and disposal—landfill or incineration. Even if the local government does not provide the service directly, it must still regulate charges made by private operators.

The purpose of this guide is to provide elected officials with a description of financing alternatives regardless of how they actually operate the program. Specifically, the guide contains information on financial planning and management, revenue sources, purchasing techniques, and financing an areawide approach.

financial planning

Planning and designing a solid wastes system with functional, efficient, and economical facilities is important. It is also important that there be careful financial planning, and that projects be scheduled on a priority basis.

The method chosen to finance the solid wastes management system can have substantial impact on the local tax rate and fiscal reserves. Elected officials can pay for the system through the following methods: general fund, bond issues, loans, service charges, or fees. The amount of money a local government is willing or able to spend determines the amount or type of improvements that can be made and the scope of the solid wastes program.

legal authority

Before making any financial decisions regarding solid wastes, state and local laws should be examined by officials to see what financing methods are permitted. State statutes and local ordi-

planning, financing, and building for the future

Montgomery County, Ohio

On October 27, 1967, Montgomery County, Ohio, officials signed 1,600 bonds with a face value of $5,000 each. These bonds and $3.3 million in general obligation bonds formed the monetary base for two 600-ton capacity county incinerators.

The incinerator revenue bonds, $8 million in value, were authorized under Section 343.07 of the Ohio Revised Code. This section states in part:

> *The board of county commissioners may issue bonds of the county for the purpose of paying a part or the whole of the acquisition, construction, or repair of any improvement provided for in Sections 343.01 to 343.08, inclusive (concerning county garbage and refuse disposal districts), of the revised code. . . .*
>
> *The board shall, in the legislation authorizing the issuance of such bonds, provide that they shall not constitute general obligations of the county or be secured by the general credit and taxing power of the county, but shall be payable solely, as to principal and interest, from the revenues of the improvement, constructed with the proceeds of the sale of the bonds, as derived from the rates or charges established for such services under Section 343.08 of the revised code, in which event the board shall covenant to fix rates or charges sufficient to provide adequate funds for such purpose, after payment of the cost of management, maintenance, and operation of such garbage and refuse collection and disposal plant and facilities.*

On November 3, 1967, contracts totaling $8.6 million were signed and a groundbreaking was held. Shortly thereafter construction began.

The enabling legislation for the incinerators and the attendant financing was passed March 7, 1967, six months before the bonds were issued. At that time, the Board of County Commissioners also passed a resolution on incinerator rates and charges. The resolution established a disposal rate of $3.50 per ton; an annual review of rates by the Advisory Board; and guarantees that rates would be uniform throughout the area and sufficient to pay the expenses of operation, maintenance, and the principal and interest of the bonds.

The $11.3 million for incinerator disposal facilities breaks down as follows: $8.6 million went for construction costs; $560,000 to purchase land and rights-of-way; $576,214 for engineering; $725,000 for capitalized interest; $500,000 for the capitalized bond fund; $138,494 for legal, fiscal, printing, and other services; and $240,000 to discount the bonds.

Thirteen years of preparation and $11.3 million have been invested by Montgomery County in this twin incinerator project. The work that has been and will be accomplished in the near future will enable Montgomery County to handle its solid wastes problem into the 21st century.

nances often place rigid limitations and restrictions upon local fiscal authority. Local officials should seek broad state enabling legislation which permits local governments to finance all services, including solid wastes collection and disposal, by the following methods:

1) entering into intergovernmental agreements and contracts to acquire facilities and operate programs jointly;
2) collecting taxes and special charges;
3) issuing bonds;
4) recalling bonds for fewer interest payments;
5) refinancing bonds for lower interest rates;
6) issuing liens against property for delinquent taxes or charges;
7) periodically reviewing and revising debt limitations on general obligation bonds;
8) exempting from debt limit, revenue bonds secured by service charges (to the extent that bonds are supported by such charges);

9) accepting grants-in-aid;
10) acquiring property by gift, purchase, or eminent domain; and
11) levying and collecting service charges, including charges from owners of tax exempt property.

Communities should have the legal authority to meet emergency situations through contingency funds, supplemental appropriations, and refinancing.

capital improvement budgeting

Local government should have an overall capital improvement budget which schedules the funding of all necessary solid wastes facilities. A capital improvement budget links planning and implementation. The capital budget, with its specific projects arranged in order of priority, estimated project costs, and suggested financing methods, enables governments to plan ahead for major capital outlays. Essentially, capital improvement budgeting is long-term financial planning which establishes a funding schedule for a five- to ten-year period.

Typically, capital outlay funds are needed for:

1) bond service—interest on prepayment of indebtedness;
2) sanitary landfill sites;
3) incinerator plants;
4) transfer stations;
5) collection equipment;
6) disposal site equipment;
7) back up equipment;
8) office space and equipment; and
9) garage space and maintenance equipment.

Operating costs include:

1) salaries and fringe benefits;
2) utility and fuel costs;
3) uniforms;
4) insurance premiums;
5) public education programs; and
6) facility maintenance and repair costs.

financial campaigns

Long-range financial planning must include informing the public of the need for a good solid wastes management system. For example, campaigns for bond issues must begin well in advance of the referendum to gain public understanding and support. For information on how to gain and maintain citizen support, see *Guide Number 8, Citizen Support.*

revenue sources

The nation's urban areas spend in excess of $4.5 billion annually for solid wastes services. The federal Bureau of Solid Waste Management estimates that $1.7 billion is spent on collection and disposal by local governments, and approximately an equal amount by private industry.

Local governing bodies have three general sources of money for construction and operation of a solid wastes program: (1) general fund (including fee and service charge revenues), (2) bond issues, and (3) grants-in-aid. The solid wastes management system should be financed primarily by the first two and supplemented by the third. Annual operating expenses are usually met by the general fund, services charges, or grants-in-aid, but not by general obligation bonds. (Grant-in-aid and other financial assistance programs currently available are described in *Guide Number 7, Technical and Financial Assistance.*)

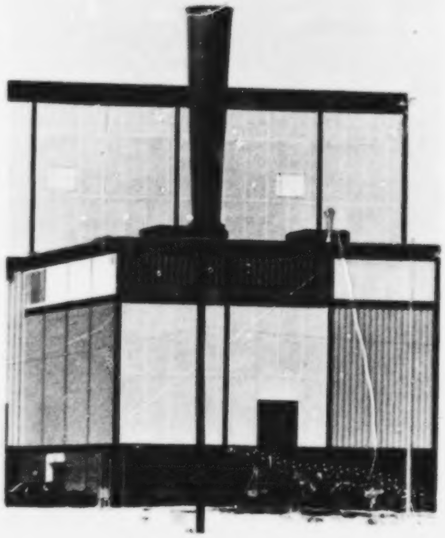
general revenue

General revenue can come from the traditional property tax or other sources such as local income or payroll taxes. The major advantage of general revenue financing is that the entire area participates in financing and can benefit from complete solid wastes management. When there are no separate service charges, there are no problems or expenses of billing and collection. The City of Los Angeles, California, finances its $19-million residential collection and disposal program from the general fund.

There are disadvantages of financing solid wastes facilities and operations from the general fund. Most cities and counties rely on the property tax as a major source of revenue for all public services so solid wastes programs must compete with them for funds. Traditionally, other governmental functions have received higher priority than the management of solid wastes.

It may be unfair to use general revenue funds to collect and dispose of commercial and industrial solid wastes because of the large quantities industry produces. However, a great portion of general funds may be derived from commerce and industry. Special charges can be made for commercial and industrial wastes or the operation can be left to private solid wastes companies, which is usually what occurs.

Another disadvantage of general fund financing is that tax-exempt properties may get free solid wastes services which other citizens must pay for in their taxes. Of course, this is true of all public services. Finally, the amount of general revenue derived from a particular property may have no relation to the amount or frequency of solid wastes services required.



The Troy-Piqua (Miami County), Ohio, incinerator is one of the newest in the country, having been fired-up in spring of 1968. The incinerator is not handling all county wastes at this time, but it is hoped that it will become the sole county disposal site in the near future.

In a 1964 survey, the American Public Works Association (APWA) found that 429 of 857 cities responding to a survey financed their solid wastes collection service with funds from the general property tax alone. These cities make no additional charges for collection.

A few cities finance part or all of collection and disposal service by levying separate ad valorem taxes on the same base as the general property tax.

A common method of financing solid wastes collection is through a special assessment tax against properties benefited. The special assessment tax is usually based on property footage or other evaluation and may not be equitable because it is not necessarily related to the amount of solid wastes services provided.

Local income or payroll taxes are being used increasingly. Since the first modern local income taxes were adopted by Philadelphia and Washington, D.C., in 1939, the roll has grown to more than 170 municipalities (see bibliography for further information). Income or payroll taxes are "broad based." This type of tax has the additional advantage of yielding more revenues as the economy grows and the amount of solid wastes increases accordingly.

bonds

Bonds may enable community residents to obtain facilities when needed. They also provide an equitable means of sharing costs between present and future users.

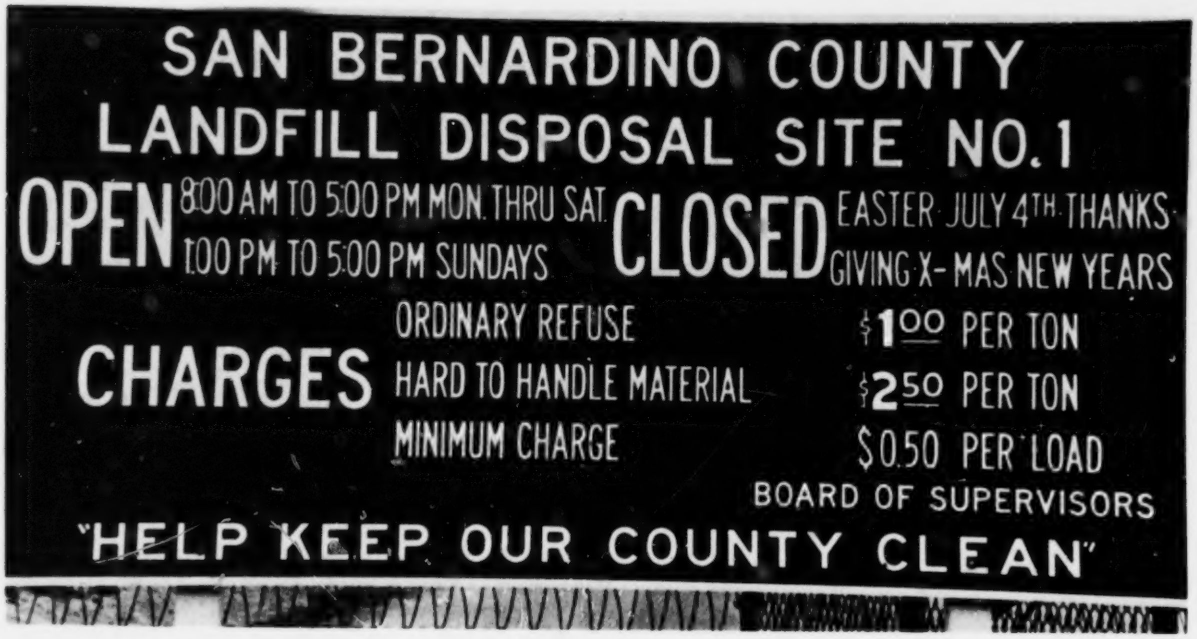
Two types of bonds normally used by local governments are general obligation and revenue bonds. Two other types of bonds, not as frequently used, are special assessment and industrial revenue bonds.

Bonds are generally issued in $1,000 or $5,000 denominations. This is called the "face amount" or "par value." A majority of

TABLE I
SUMMARY OF ALTERNATIVE METHODS OF FINANCING CAPITAL REQUIREMENTS

ITEM	PAY-AS-YOU-GO	LEASING	SUBSIDIES/GRANTS	BORROWED FUNDS
1. EXPLANATION	1. Yearly appropriations to finance requirements—either by accumulating funds in advance or meeting obligations as they occur.	1. Straight rental with no intent to purchase or own (actually a form of pay-as-you-go).	1. State or federal aid available for acquisition and construction of facilities, or for equipment acquisition.	1. Long-term debt financing—analogous to mortgage financing. Several methods available—see Table II for comparison.
2. ADVANTAGES	2a. Generally, the least expensive. b. Accumulated funds provide maximum flexibility to meet unanticipated needs. c. More certain than subsidies or bond issues requiring vote.	2a. Requires no capital investment. b. Provides high degree of flexibility in meeting unexpected or changing conditions such as location or amount of space required; and amount or type of equipment.	2a. Lower the property tax burden or reduce service charges. b. Represent the return of local taxpayers' money. c. Can reduce total costs by permitting earlier construction/acquisition or by reducing amount of borrowed funds used.	2. These are general advantages applicable to all methods. a. Reduce immediate financing requirements. b. Permit construction of critical facilities or acquisition of equipment without delay. c. May provide some savings through earlier construction/acquisition—such as avoiding inflationary construction costs or rental costs. d. We can expect to repay with "cheaper dollars" if inflation continues.
3. DISADVANTAGES	3a. Exclusive use usually results in significant tax rate increase. b. Relieves future citizens from responsibility of paying for facilities/equipment from which they will benefit.	3a. Most expensive if used over extended period. b. Does not produce any equity in facility/equipment. c. Leased facilities sometime create operating problems because of location or layout: Leased equipment may not meet specifications we would use for purchase of new equipment.	3a. Regulations generally accompany the money. b. Some costs involved in preparing and processing applications. c. Uncertainty of receipt due to change in rules or cutback of funds.	3a. Interest costs are major drawback, can vary from 30% to 50% of principal depending on: 1) Repayment period; 2) Schedule of principal retirement; and 3) Interest rate. b. Limits (practical and legal) to amount of borrowing that can be used.
4. PROPOSED GUIDELINES	4. As a general statement, pay-as-you-go is the best method of financing and should be used as extensively as possible with consideration given to: a) our total budgetary requirements and financial resources; b) our total construction needs; c) the benefit of the facilities/equipment to future residents; and d) the availability of subsidies. Pay-as-you-go should be used whenever possible for minor needs or for additions, improvements, and modifications to existing structures/equipment.	4. Whenever needs are well defined, short-term renting generally should be considered only as a temporary solution while plans and/or financing arrangements can be developed for permanent facilities/equipment. Three- to five-year leases should be considered whenever major uncertainties exist concerning the need for space—either in terms of scope, timing, or location.	4. The availability of subsidies should not be used as the justification for constructing a facility/acquiring equipment. However, an attempt should be made to obtain subsidies on approved projects to reduce the local property tax burden/service charges. Any financing plan which anticipates subsidies should be flexible enough to allow for some under-collection.	4. Long-term debt financing should be used if a) a pay-as-you-go policy places too great a burden on current sources; and b) borrowing does not create equally severe future financing problems. The borrowing method should be evaluated in relation to the type of facility/equipment to be acquired.

Source: Sacramento County, California, Office of the County Executive, March 6, 1968. "Refuse Collection Operation"


SAN BERNARDINO COUNTY
LANDFILL DISPOSAL SITE NO. 1
OPEN 8:00 AM TO 5:00 PM MON. THRU SAT.
1:00 PM TO 5:00 PM SUNDAYS
CLOSED EASTER JULY 4TH THANKSGIVING X-MAS NEW YEARS
CHARGES
ORDINARY REFUSE $1.00 PER TON
HARD TO HANDLE MATERIAL $2.50 PER TON
MINIMUM CHARGE $0.50 PER LOAD
BOARD OF SUPERVISORS
"HELP KEEP OUR COUNTY CLEAN"

At the entrance to each landfill site in San Bernardino County, Calif., is a sign stating hours and days of operation and the various charges for disposal. In the county, collection is handled by the municipalities and private contractors. The collectors are regulated by the county as are collection and disposal rates.

issues are sold in serial form, meaning that the issue has maturities scheduled annually or semi-annually over a period of years. Other issues, known as "term" bonds, have a single maturity date on which the full amount is payable.

General Obligation Bonds. General obligation bonds are obligations backed by the full faith and credit of the local government selling the bonds. The full resources and taxing powers of the government are irrevocably pledged to meet debt payments. In some states, general obligation bonds offered by local governments require a vote of the electorate before the governing body can issue them.

General obligation bonds are payable from ad valorem taxes levied on property situated within the jurisdiction's corporate limits. The phrase "ad valorem" literally means "according to the value," and in the parlance of taxation corresponds to the tax levied according to the assessed value of the property. General obligation bonds appeal to a broad spectrum of investors because the interest received is exempt from all federal income tax; thus the local government issuing the bond usually pays a lower interest rate.

Revenue Bonds. Revenue bonds are obligations to finance self-supporting facilities. The bonds are secured solely by the fees, charges, and other earnings of the project. Revenue bonds are not paid out of general tax revenues. The revenue bond can be used to finance incinerators and sanitary landfills. Should these earnings prove inadequate, the sole remedy for the bond holders is a readjustment in fees and charges to improve earnings. Normally there is no bond referendum for this type of bond.

Both general obligation bonds and revenue bonds have been used by city and county governments in financing incinerators and sanitary landfills.

Special Assessment Bonds. Financing solid wastes programs

financing a solid wastes disposal system

County Sanitation Districts of Los Angeles County, California

The Los Angeles County Sanitation Districts were established in 1923, originally to provide sanitary sewer systems and treatment facilities. Currently 13 of the 25 sanitation districts are engaged in solid wastes disposal.

The governing body of a sanitation district is a board of directors of not less than three members. The majority of the members of a sanitation district board are elected officials, one from each city having territory within the district. In those cases where the sanitation districts include unincorporated territory, at least one county supervisor is a member of the governing body. Each sanitation district is a separate entity and has its own board of directors. For administrative economy and convenience, all the districts in Los Angeles County jointly finance a single administrative and engineering facility under the terms of a joint administrative agreement.

In October, 1950, and again in September, 1955, the chief engineer of the districts submitted reports to the boards of directors of the county sanitation districts outlining the status of solid wastes management in Los Angeles County. In 1950, a solid wastes disposal system was established in 13 of the 25 sanitation districts and funded by a modest tax

through special assessment bonds is another technique used by local governments. Basically, this method entails levying a specified rate (often per foot of frontage) and a flat sum for each type of property. According to *Preparing a Bond Offering*, there are two types of special assessment bonds: "special-special"—payable only from the special assessments; and "special-general"—a charge against the full faith and credit of the government if assessments are inadequate. Special assessment bonds are often difficult to sell today, but those with the special-general feature are the easier of the two types to sell.

Industrial Revenue Bonds. In over 40 states industrial revenue bonds may be issued by cities and counties to finance the construction or acquisition of industrial facilities. To date such bonds have not been used for financing solid wastes activities. The 1968 *American County Platform* of the National Association of Counties has described the problem of industrial bonds as follows:

> The use of general obligation or revenue bonds by counties to finance the construction or acquisition of industrial facilities is a threat to the credit of county government, the industry thus financed, financial institutions regularly engaged in such financing, and the whole system of private enterprise. It may impair the ability of county government to finance its own necessary capital expenditures, both because of the ever-present possibility of default and the threat to the tax exemption feature which is involved in this kind of abuse of governmental credit.

levy of two cents per $100 assessed valuation for a five-year period and one cent per year for the following five years.

Within four years of 1955, ten districts actively pursued the acquisition and implementation of five landfill sites and one transfer station. The cost of acquisition and implementation of the facilities was greater than the funds accumulated through the districts' special tax levy. To accomplish the planned system, the districts initially entered into joint powers agreement for operation of the five landfill sites with Los Angeles County and, in the case of Scholl Canyon landfill, with a third party, the City of Glendale.

The county acquired fee title to the Palos Verdes landfill property by paying 40 per cent of the land purchase price. The balance of the purchase price, as well as the implementation costs, came from the sanitation districts' tax fund. The Spadra landfill property was purchased by the county. The sanitation districts provided implementation funds and agreed to repay the county's acquisition costs at no interest with revenue derived from charging a fee for disposal. The South Gate transfer station was entirely financed by the sanitation districts' funds. Mission Canyon and Calbasas landfills were established by county purchase of the land and advancement of "start-up" funds to the districts. The agreements provide that the districts make annual payments to the county to repay completely all county costs at no interest by the time the landfill capacity is depleted.

To acquire land for long-range disposal needs and to convert completed landfill areas into park and recreation facilities, the districts and the county entered agreements providing that all surplus revenue, above the revenue acquired to operate and maintain the sites, be deposited in a special fund. A separate new agreement between the county and the districts established the Los Angeles County Refuse Trust Fund. The new agreement provides that the fund be administered jointly by the directors of the districts and the county Board of Supervisors. Expenditures from the fund can be made only for acquisition of solid wastes disposal facilities, and landscaping and beautifying landfills as they are completed. To build up the fund, landfill disposal rates were raised approximately 25 per cent in 1965.

In unusual situations, public officials can establish a non-profit corporation under state corporation laws to issue revenue bonds for waste management. This type of bond does not apply against the local government's debt limits.

In 1967, the City of Omaha, Nebraska, had to comply with a directive from the Federal Water Pollution Control Administration to stop polluting the Missouri River. By means of a cooperative venture, a corporation called the Omaha Pollution Control Corporation was organized, pursuant to the Nebraska Non-Profit Corporation Act (Sec. 21-1901 et seq., R.R.S. Neb. 1943). The corporation issued $5.5 million in revenue bonds to construct the collector sewer system and treatment facility. The city contributed $1.2 million through the issuance of its general obligation bonds. The corporation entered a 30-year lease-purchase agreement with the city at a rental sufficient to retire its bonds. As soon as the bonds are retired, the facility will revert free and clear to the city.

The advantages of using a non-profit corporation were that the lease-purchase agreement was deductible in figuring debt limitation, the city avoided further erosion of its borrowing power, and it was not required to increase its mill tax levy. In addition, a non-profit wastes management corporation can issue revenue bonds without voter approval.

loans

A few counties have resorted to financing segments of their capital development programs with local bank loans. This can be expensive because of high interest rates. However, in Los Angeles County, California, the sanitation districts have entered into time-purchase contracts based on prearranged commitments from local banks. According to the division engineer of the districts, the interest rates on these transactions have not been high.

service charges and fees

Service charges or fees for solid wastes services should be based on the amount and kind of service required and the benefit received by the customers. Many local governments have adopted service charges when general fund appropriations do not cover expenses. The use of service charges or fees to finance solid wastes services is appealing to officials because it avoids tax increases; an affirmative vote of the electorate is not required; and even tax-exempt properties must pay for the services.

The following list of service charge advantages is drawn from American Public Works Association's *Refuse Collection Practices.*

1. They are an additional means of revenue.
2. They do not involve revenue from the general property tax.
3. Solid wastes producers pay in proportion to the amount of solid wastes generated.
4. Use of service charges for collection and disposal may result in a more accurate analysis of quantities of solid wastes and a more equitable method of paying for the services rendered.

The following features are two major disadvantages.

1. There are substantial costs involved in administering a service charge system.
2. They are a departure from the ability-to-pay principle and may be regressive in that low-income families pay a proportionately higher share of their income.

Collection Charges. Collection charges have been established using the following guidelines.

A flat or uniform charge per building is the simplest rate structure and is often applied to residential areas. It is considered unfair since multiple dwelling units, apartments, and commercial and industrial establishments pay the same rate despite the large quantities of solid wastes they generate.

A charge has been used based on number of rooms in residential areas or on floor space in commercial areas.

Rates for multiple dwelling units are often higher because of the large quantities of wastes they generate and the need for more frequent collection. But this does not always increase costs; in some cases wastes are cheaper to collect because there are more wastes in one spot.

A charge based on the number and size of containers can be equitable if "garbage" cans are of uniform size. Additional charges can be made for odd-sized solid wastes receptacles because of special handling and inconveniences to collection crews.

Communities which supply bulk containers for commercial and industrial solid wastes can charge a rental fee. Tacoma, Washington, and Tucson, Arizona, supply and maintain large portable containers for commercial establishments and charge for container use and services rendered according to a set rate schedule. At disposal sites, fees can be established according to the weight of solid wastes.

Total cost bidding has been used in San Bernardino County, Calif., for almost all major equipment used by the Department of Sanitary Engineering. At the site pictured above, the county has two bulldozers of this type, two large earthmovers, and a compactor.

Public officials can establish differential rates by districting areas on the basis of topography, which affects the difficulty of making collections. Separate charges may be made for special services. Special rates can be established when solid wastes customers require frequent service.

Service charges for commercial and industrial properties are generally more complicated because of greater variation in service. A considerable amount of equipment used for commercial and industrial collection is specialized and very expensive. Cities and counties that operate collection systems usually do so only for residential solid wastes, leaving private operators to bid for separate commercial and industrial accounts. For example, the City of Los Angeles collects only residential solid wastes and commercial garbage, about one third of all solid wastes produced. The remainder is collected and disposed of by private operators.

As a public policy, elected officials should regulate all public and private rates in their jurisdiction.

The City of Frostburg, Md., uses compactor vehicles on almost all collection routes. Though these vehicles cost more than some other types of collection vehicles, the advantages in cleanliness, capacity, operating ease, and appearance far outweigh the additional cost.

Transfer Station Charges. Public policy should be established on who may use the transfer station; what types of wastes are acceptable; what the basic rates will be; how much will be charged for residential wastes and how much for bulky materials; when the station will be open; and whether credit will be extended to regular users.

The Los Angeles County Sanitation Districts' South Gate transfer station established a basic rate to deposit solid wastes on a per ton basis, but rates for hard-to-handle, bulky materials are higher.

Disposal Charges. To help establish equitable disposal service charges each disposal site should be equipped with scales. Service charges set on a per-ton basis are generally more equitable than those based on per-cubic-yard basis because weight can be more accurately determined. Many jurisdictions have adopted the desirable practice of setting disposal rates for sanitary landfills or incinerators high enough to recover operating and maintenance costs.

The Los Angeles County Sanitation Districts charge for use of their five sanitary landfill sites on a per-ton charge for the net weight. Payment is accepted in cash or credit. By posting a bond or cash deposit equal to an anticipated month's charges, a regular customer can be issued a credit card for each of his vehicles with the vehicle tare (unloaded) weight imprinted on it. The weighmaster then accepts the card from the driver, weighs the loaded vehicle, marks the weight and charge on a printed receipt, and returns the credit card and a copy of the receipt to the driver. The customer is billed at the end of the month. Governmental agencies are exempt from the bond requiremnt.

purchasing techniques

total cost bidding for purchasing

Total cost bidding for purchasing is an effective tool for making the scarce tax dollar work efficiently. The concept of total cost bidding is based on the fact that the purchase price is only part of the total investment in a piece of equipment over its working life. When officials purchase equipment they are faced with six basic considerations:

1) equipment capability,

2) purchase price,
3) operating costs,
4) repair and maintenance costs,
5) downtime, and
6) resale value.

Traditionally, many local governments have purchased equipment on a "low bid basis," not considering what the total operating costs may be over a period of time in relation to more expensive equipment.

Local governments should use performance-type specifications which take into account job requirements, newest equipment developments, and probable maintenance and operating expenses. Performance specifications should be drawn up by the department or agency using the equipment in consultation with the engineering specialist and the purchasing office. Many large jurisdictions, such as Cincinnati, Ohio, utilize an interdepartmental or agency committee to review requests and specifications for equipment and to make recommendations once bids have been received.

Performance specifications must consider geographical limitations, warranty service, standardization, bid exceptions, alternate bids, testing procedures, and the like. For example, a service warranty for one year should provide that if broken equipment is not repaired within 24 hours a substitute will be provided. All equipment should be inspected upon delivery to be sure it meets specifications.

The Orange County, California, refuse disposal engineer recommends:

> Due to the economics of the solid wastes disposal operation, it may be a good policy to purchase more expensive equipment because it may cost less to maintain and will bring higher trade-in value. Since most local governments cannot afford standby equipment, it is wise to purchase equipment that runs the maximum time with the least amount of downtime.

Bidders should supply a performance bond to fulfill the terms of the contract and the financial obligation at the time of purchase. Total cost bidding requires each bidder to evaluate the performance of his equipment in dollars and cents.

pay-as-you-go financing

When local governments use pay-as-you-go financing, they pay for facilities and equipment with available funds as they construct or acquire them. This is done either by accumulating funds in advance or by expending funds to meet obligations as they occur.

The major advantage of this method on a short-term basis is that it is generally less expensive than other methods. Also, a pay-as-you-go policy avoids the uncertainties involved in obtaining subsidies, grants-in-aid, or passing bond issues. The major problem with pay-as-you-go is that it cannot be used on a long-term basis without significant increases in tax rates or service charges. During the accumulation of funds, the savings in interest costs may be offset by inflationary increases in construction or acquisition costs.

A Hennepin County, Minnesota, official stated:

> Pay-as-you-go should not be dismissed as a lesser or

TABLE II
COMPARISON OF METHODS OF LONG-TERM DEBT FINANCING FOR CAPITAL REQUIREMENTS

ITEM	GENERAL OBLIGATION BONDS	REVENUE BONDS	LEASE/LEASE BACK	LEASE PURCHASE
1. EXPLANATION	1. Are issued by a governmental agency and secured by the taxing authority of that agency. Are the most common long-term financing method used by government.	1. Are similar to general obligation bonds except they are repaid from a specific revenue source and are not a legal liability of the general fund. May be used for airports, refuse disposal facilities, hospitals, and any revenue producing facilities.	1. Involves the sale of municipal bonds without a bond issue election. This is accomplished by creating a non-profit corporation with the power to sell bonds, and lease the necessary facilities/equipment to the county, which acquires ownership when the bonds are retired.	1. An investor builds a facility or fabricates equipment to county specifications. The county leases the facility/equipment for a specified period and pays the actual cost plus a stated rate of interest. At the end of the period the county owns the facility/equipment.
2. ELECTION REQUIREMENTS	2. Election is required. A 2/3 majority is needed for approval.	2. Election is required. Simple majority approves.	2. No election required.	2. No election required.
3. INTEREST COSTS	3. Generally have the lowest interest rate.	3. Generally, have a higher interest rate than either general obligation bonds or the bonds sold under the lease/lease back arrangements.	3. Next lowest interest rate to general obligation bonds.	3. Has the highest interest rate.
4. INCIDENTAL COSTS	4. Include election costs, preparation of bond sale brochures, and servicing of bonds.	4. Include election costs, preparation of bond sale brochures, and servicing of bonds. May be slightly higher than general obligation bonds due to brochures.	4. Has the highest incidental costs. Although there are no election costs, outside legal and financial services are required.	4. Little or no direct incidental costs.
5. STATUTORY LIMITS	5. Our total bonded indebtedness is limited to 5% of our assessed valuation.	5. Can only be used for certain facilities which will produce revenue to retire the bonds and pay interest costs. They do not count as a part of our statutory bonded indebtedness limitation.	5. No statutory limits. However, there are complex legal requirements.	5. No statutory limits on use. However, if the retirement fund is the investor, it is limited to investing a maximum of 25% of the fund for facilities only.
6. OTHER FACTORS	6. None.	6. The users of the facility pay for its cost. (This would also be true if revenues were used to pay debt retirement costs under any of the other methods.)	6. This is a complex method of borrowing which requires time to develop.	6. This is generally the quickest and easiest way to "borrow" funds.
7. PROPOSED GUIDELINES	7. General obligation bonds should be considered as the primary source of borrowed funds within the overall financing program and generally should be considered for major projects of long-term benefits to the total community. They should also be considered for revenue producing activities because of lower interest rates. The time requirement and uncertainty in approval of bond issues makes it difficult for them to be considered for urgent projects. A secondary method of financing also should be developed in the event the bond issue fails.	7. The use of revenue bonds should be considered for any revenue-producing activity. This should not, however, preclude the use of other methods of borrowed financing if they are more advantageous, or if the voters do not approve a revenue bond issue.	7. This method should be considered only if a bond issue appears to be unfeasible, or if an urgent and unanticipated need develops.	7. This method should be considered only if a bond issue appears to be unfeasible, if an urgent and unanticipated need develops, or if the costs will be willingly paid by some other agency than the county (sub-lessee). The employees retirement fund should be given preference over private investors if this method is used.

Source: Sacramento County, California, Office of the County Executive, March 6, 1968. "Refuse Collection Operation"

> undesirable financial technique. Granted, it is unfair to today's taxpayer, who will be sustaining a disproportionate share of capital equipment costs, which should be a community liability over an extended period of time. Given the rigid financial shackles imposed by legislatures on local governments, pay-as-you-go is a means of financing capital programs. . . . Pay-as-you-go is an effective device when other alternatives are absent for those political bodies who are desirous of meeting and fulfilling their responsibilities.

lease-purchase

Essentially, lease-purchase involves private construction of public facilities. The usual method of implementation is for a private investor to construct a building and to lease it to the public agency for a specified number of years. At the end of the payment period, the private investor will have received his total investment, plus interest and profit, and the government agency receives title to the building. The overall costs are higher than those incurred when bonds are issued because the builder is subject to local, state, and federal income taxes and must make a profit.

Purchase from a non-profit corporation can be considered the

pay-as-you-go financing through a public utility

Tacoma, Washington

Since 1929, the City of Tacoma, Washington (population 162,000), has operated a solid wastes management system on a pay-as-you-go basis, along with the other municipal utilities of water, sewer, and light. The Utilities Services Division of the Department of Public Works, although independently financed, is an integral part of the municipal government. The utility provides complete city collection of residential, commercial, and industrial wastes. There are no agricultural waste producers.

Weekly residential wastes pickup is provided at $1.50 per month and is billed bi-monthly along with other utility charges. Special pickup service for large accumulations of waste or bulky items is available upon request at an hourly charge for men and equipment. In 1967, residential collection revenue amounted to $768,593.30; special pickup revenue to $10,232.05. The utility also sells some paper for salvage.

An ordinance requires residential wastes to be stored in 20- to 30-gallon metal containers with tight lids. Garbage and trash are mixed and collection is made in alleys by crews of three men per compaction vehicle—a driver plus two laborers.

For chemical and industrial collection, the city rents 500 one-cubic-yard bins for $3 a month each, plus a collection charge. Users may also rent 10-cubic-yard units for $25 per month for the first container and $15 per month for each additional container. The city maintains and washes the bins at least monthly. Revenues from commercial and industrial collections in 1967 were $484,201.05.

The city has operated a sanitary landfill within the city for over ten years. City residents are permitted to bring any material to the landfill. County residents are charged a nominal fee.

The utility works with other city departments for central purchasing of equipment and civil service competitive examinations and rating of employees. Only division and department heads are not under municipal civil service. They are appointed by the city manager. The city provides health and life insurance and other benefits for civil servants. Utility employees have maintained a high safety record. Employees accrue one day's sick leave each month, and from two- to five-weeks annual vacation, depending on years of service.

In 1967, the refuse utility had a gross income of $163,233.46 and a net income of $48,578.27. The Tacoma utility has operated at a profit for its entire 39-year history.

Weigh stations are located at each landfill in San Bernardino County, Calif. Regular users have a "credit card" arrangement with the county, and one-time or occasional users can pay cash for disposal. There is no guessing involved. The loaded vehicle is weighed on the way in, and the empty vehicle is weighed on the way out. The difference in weights determines the cost.

most favorable type of lease-purchase arrangement, although it is more complicated. Since it involves lower interest rates, it can be nearly as advantageous as general obligation bonds.

It may be implemented by formation of a non-profit corporation for the single purpose of constructing a building. The county signs a long-term lease for the building, and the non-profit corporation finances construction by sale of corporation bonds. These bonds are guaranteed by the lease agreement, and interest earned is tax-free income to bondholders. At the end of the lease period, ownership of the building is transferred to the jurisdiction and the corporation is dissolved.

This method permits construction to local government specifications by competitive bidding. Legal and financial arrangements are more complex for purchase from a non-profit corporation than through standard lease-purchase. Nevertheless, it is being utilized in a growing number of jurisdictions, especially for the construction and operation of sewage treatment facilities. (See Tables I and II for a comparison of methods of long-term debt financing.)

leasing

The primary advantage of leasing is that it requires no capital investment. It provides some flexibility in meeting unexpected or changing conditions such as location or amount of space required or the amount or type of equipment.

Over an extended period, leasing is the most expensive method of providing facilities and equipment because the rate of return on private capital involved is much higher than any borrowing rate. Rental payments do not produce any equity in facilities or equipment. In some cases leased facilities also create operating problems because of location or layout.

use of purchasing techniques

Each of the various purchasing techniques can be used in implementing a solid wastes management system, but each technique has particular advantages in special situations.

Pay-as-you-go is used for purchasing small, everyday items in the county budget, but on items above $5,000 a county must determine what will be the most efficient use of its money. If a county is going to buy a compactor for a landfill, it should determine what the service charge would be if paid in installments or through a lease-purchase contract. If the service charge is significantly lower than interest rates at the local bank, then the amount can be deposited to earn interest while the county pays the lease installments.

Lease-purchase is an effective tool for making the most efficient use of money over the term of a contract. It is also effective in reducing the amount of money which must be paid out at a single time. For example, if a county did not have sufficient funds to purchase a fleet of collection vehicles, or was prevented from obtaining the money by state and local fiscal restrictions, lease-purchase might be a useful tool.

Leasing a piece of equipment, facilities, or land is a feasible method of financing when an item will be needed only for a short time. For example, if a county needed a landfill site with a life of three years, and did not intend to use the land after completion, it might lease the land for the three-year period.

financing an areawide approach

Whenever possible, solid wastes management should be handled on an areawide basis instead of by individual jurisdictions. For example, disposal operations can be established to serve many jurisdictions within a large area. Through the use of interlocal agreements and contracts, jurisdictions can benefit from economies of operation by pooling equipment, personnel, and disposal sites. The operation can be financed equitably by charging participating communities according to the amount and kind of wastes generated.

summary

Solid wastes management is a necessary public service which must be adequately financed. There are two basic financial decisions: (1) how to finance capital requirements; and (2) how to meet operating costs. If the local government decides to provide direct collection and disposal services, then it faces the problem of financing capital requirements. If private industry provides the service, local government is still responsible for regulation.

Since the system must be financed within the constraints of state laws and local charters, these should be thoroughly examined during the planning process. Local governments can pay for the system through the following methods: taxes, bond issues, loans, service charges or fees, and leases. The local capital improvement budget should schedule the financing of all necessary solid wastes facilities and equipment.

If the solid wastes management system is operated on an areawide basis, economies of operation can benefit each jurisdiction.

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7 technical and financial assistance

technical and financial assistance

introduction

Technical assistance from federal, state, and private sources is available to local officials to develop or expand their existing solid wastes management systems. In addition, limited financial assistance is available for investigating and demonstrating new approaches to local solid wastes management. Local government officials should provide adequate financing for good solid wastes management whether or not federal or state funds are available.

This guide describes federal solid wastes activities and the types of technical and financial assistance available. (See the Appendix for the addresses of federal agencies listed in this guide.) Most federal assistance is provided by the solid waste management program. Sometimes assistance from other federal programs can be used indirectly by local officials for solid wastes management. Some state governments and universities are also able to provide planning and technical assistance.

Another source of information is the private solid wastes industry, which performs over half of the local solid wastes management operations, and equipment manufacturers.

the federal solid wastes programs

Until enactment of the 1965 Solid Waste Disposal Act (P.L. 89-272), little federal technical and financial assistance was available to local officials.

The Solid Waste Disposal Act states that its purposes are:

(1) To initiate and accelerate a national research and development program for new and improved methods of proper and economic solid-waste disposal, including studies directed toward the conservation of natural resources by reducing the amount of waste and unsalvageable materials and by recovery and utilization of potential resources in solid wastes; and

(2) To provide technical and financial assistance to state and local governments and interstate agencies in the planning, development, and conduct of solid-waste disposal programs.

The act directs the Department of the Interior to aid in solving solid wastes problems resulting from the extraction, processing, or utilization of minerals or fossil fuels. The Department of Health, Education and Welfare was assigned all other responsibilities and these have since been reassigned to the U.S. Environmental Protection Agency (EPA), and include the following:

1) conduct and support research;
2) provide training;
3) provide technical assistance;
4) provide support for local, state, and interstate projects demonstrating new and improved techniques;

5) provide support to demonstrate areawide solid wastes management planning; and
6) provide support for state and interstate surveys of solid wastes requirements and the development of state and interstate plans.

u. s. environmental protection agency

EPA assists states, interstate agencies, and local governments interested in solid wastes management. The Federal solid waste management program is concerned with the total solid wastes problem, including storage, collection, treatment, utilization, processing, and final disposal.

The program provides financial and technical assistance to state and local governments through demonstration grants, study and investigation grants, interstate planning grants, training, and direct technical assistance. Presently no program provides construction funds. Funds are limited and competition for grants is on a national basis. Local governments that receive grants can contribute their share in kind—personnel, equipment, and land.

Demonstration Grants. Demonstration grants are awarded for study and investigations, and/or demonstration of new, unique, or improved methods of solid wastes storage, collection, processing, and disposal. They can be awarded to interstate, state, county, and city agencies or to public and private nonprofit organizations. Some are designed to demonstrate the feasibility of new and improved technology; others are designed to take advantage of existing knowledge that has not been fully utilized. For example, the City of Barrington, Rhode Island, received a $30,830 grant to demonstrate the feasibility of solid wastes collection by the paper bag system and to determine the effect of this method on the capacity of sanitary landfills. Oklahoma County, Oklahoma, received a $20,650 study and investigation grant to prepare a long-range areawide plan for the collection and disposal

demonstration grant for strip mine reclamation

Allegany County and Frostburg, Maryland

Allegany County officials thought their abandoned strip mines could be used for solid wastes disposal and proposed the idea to the Maryland Department of Health. The Division of Solid Wastes of the state health department received a federal Bureau of Solid Waste Management grant to determine whether strip mines could be effectively utilized for the disposal of solid wastes. The state health department, the Board of Allegany County Commissioners, and the City of Frostburg agreed to work together on a three-year program. A suitable site was selected near Frostburg and in April, 1967, sanitary landfill operations began.

Federal funds cover two-thirds of project costs, the remaining one-third is financed by the City of Frostburg and Allegany County. Funds are administered by the Maryland health department, which provides most of the technical assistance.

General operation of the site is directed from a mobile office trailer. Other facilities at the site include a portable 80,000-pound capacity platform scale with attached printout device; a trip counter for motor vehicles; a small bulldozer; and a system of outside lights.

The Frostburg sanitary landfill is expected to last 12 years. When completely filled, covered, and landscaped, it will serve as a recreation area.

of solid wastes in Oklahoma County and the adjacent populated areas.

Funds may be used for personnel, equipment, supplies, and design and construction of facilities specifically related to the project.

Participants must be willing to make all information, uses, processes, patents, and other developments resulting from activities supported by grant funds readily available to the public. Officials must assure the program that open dumping and open burning will be abolished within the political jurisdiction where the demonstration is to be conducted. Demonstration grants must be coordinated with existing state or interstate solid wastes management plans.

The large number of recreational areas in Angeles National Forest necessitate a local landfill operated by San Bernadino County, Calif. This landfill, purchased from a private citizen, is located near major recreational centers in the forest.

Survey and Planning Grants. Survey and planning grants are awarded to state and interstate agencies which have been designated or established as the agency responsible for solid wastes planning. (See *Guide Number 3, Planning* for a list of states with solid wastes planning grants.) Funds may be used for personnel, equipment, travel, supplies, and related expenses.

Plans prepared with these grants must include at least the following:

- Short- and long-term goals and program objectives relating to legislation.
- Method of financing and staffing the state and/or interstate agency responsible for solid wastes management.
- A data collection system to gather and evaluate information on solid wastes problems and to devise means of dealing with them.
- Recognition of the vital partnership between solid wastes management, air and water pollution control, and urban planning.
- Recognition of potential advantages of regional programs of solid wastes management.
- A mechanism for state assistance to local agencies within the state.
- Continuing programs of public information and education.
- Appropriate attention to the potential for salvage, conversion, and utilization of solid wastes materials.
- The setting and enforcement of standards for the design and operation of solid wastes management facilities and equipment.

Training Grants. Grants are awarded by the program to schools and universities to initiate and develop graduate-level training programs in solid wastes management to help alleviate critical shortages of qualified personnel. Most of the programs offer a master's degree in engineering with emphasis on solid wastes. The majority of programs are for engineers, but a few will also accept sanitarians.

Institutions offering such programs are:
University of West Virginia
Morgantown, West Virginia

University of Florida
Gainesville, Florida

Drexel Institute of Technology
Philadelphia, Pennsylvania

Georgia Institute of Technology
Atlanta, Georgia

Rensselaer Polytechnic Institute
Troy, New York

University of Texas
Austin, Texas

University of Kansas
Lawrence, Kansas

University of Michigan
Ann Arbor, Michigan

University of Illinois
Champaign-Urbana, Illinois

University of Houston
Houston, Texas

Research Grants. Research grants are generally awarded to universities and colleges. They may also be awarded to state and local agencies which have the research facilities and capabilities to develop new techniques and further solid wastes technology. Funds may be used to meet the costs of personnel, equipment, and materials.

Technical Assistance. Technical assistance from the program is available to all local governments. Technical assistance is essentially the application of existing technology to help solve present problems and is provided by three basic methods:

1) development and distribution of technical data and information;

2) provision of guidelines and standards for acceptable solid wastes management and the development of model ordinances, codes, and legislation; and

3) provision of technical personnel for studies, surveys, and evaluations to assist individuals, local governments, and private organizations in solving their solid wastes management problems.

The program does not compete with private consulting engineers or provide the same services. Technical assistance activities are limited to gaining data and information on a national scale and developing and testing new study and analytical procedures that will be useful to local managers in the solid wastes field.

bureau of mines, department of the interior

The Bureau of Mines studies the problems of solid wastes resulting from the extraction, processing, or utilization of minerals or fossil fuels. A primary objective of the Bureau of Mines program is to develop economically attractive metallurgical or chemical processes for more efficient utilization of waste materials, such as mill tailings, slags, scrap metals, and coal plant washing wastes. Of particular importance is its research on scrap metal, which is designed to develop processes for reclaiming millions of tons of metal found in urban solid wastes and automobile bodies each year.

The Bureau of Mines awards research grants and contracts primarily to universities and colleges and non-profit research foundations which have a demonstrated background in earth sciences. One example is a grant awarded to the Commonwealth of Pennsylvania's Department of Mines and Mineral Industries. This department in turn contracted with Pennsylvania State University to make a three-year study, "Operation Anthracite Refuse." The study seeks to establish approaches and capabilities for use and removal of refuse (mine waste) from anthracite mines.

other federal programs

Other federal departments and agencies offer limited financial and technical assistance not primarily oriented toward solid wastes but which can have an indirect benefit for local solid wastes management systems. Local officials should investigate and coordinate all possible sources of federal assistance. Funds are available from various agencies for planning, land acquisition, land improvement, and manpower training. Information about soil and geologic conditions may also be obtained from appropriate agencies. In some cases, land itself may be available.

planning funds

Two agencies of the Department of Housing and Urban Development (HUD) offer funds for planning.

701 Planning Assistance Program, Department of Housing and Urban Development. Support for solid wastes management planning which is part of a community's comprehensive plan may be obtained from the 701 Planning Assistance Program. The 701 program provides grants up to two-thirds of the total cost for comprehensive planning in urban areas and rural multi-county areas.

In the solid wastes field, it assists state and local governments and multi-jurisdictional regional agencies in at least the following activities:

- Preparation of comprehensive development plans for land use and the provision of public facilities.
- Preparation of a capital improvement program.
- Local coordination and management of development planning.
- Coordination of state, county, and municipal planning activities.
- Preparation of regulatory and administrative measures to implement recommendations.

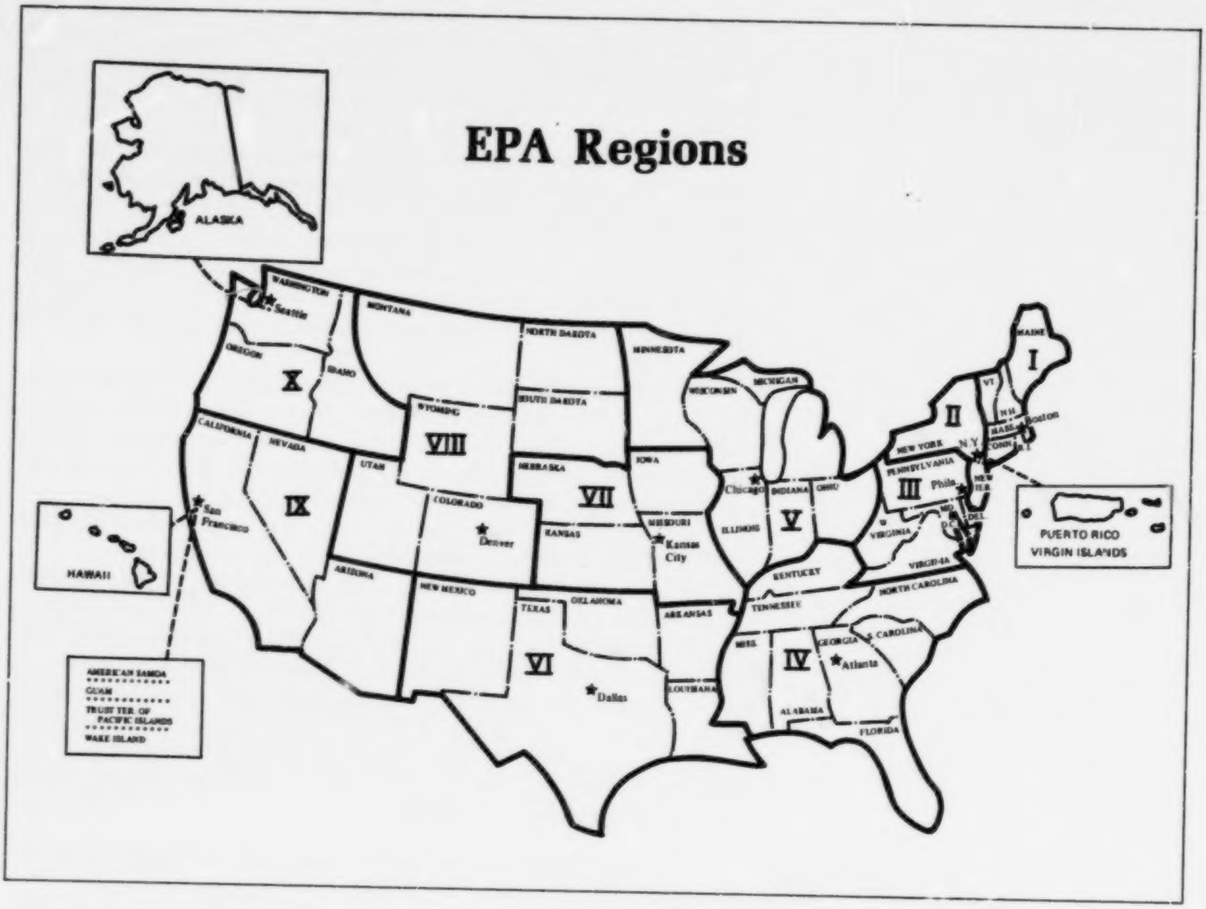
As a result of recent legislation, nearly all areas are eligible for 701 assistance. Many local government solid wastes study plans are funded in part with monies from the 701 Program.

Public Works Planning Advances, Department of Housing and Urban Development. Interest-free public works planning advances are made to state or local governments to assist in the planning of specific public works or facilities, including solid wastes disposal projects. The advances are repayable when construction of the planned project starts. In 1965, St. Louis County, Missouri, acquired an interest-free public works planning advance to finance a disposal study.

land acquisition funds

Several federal programs offer funds for land acquisition which may be used by local governments in acquiring lands for solid wastes purposes.

Advance Acquisition of Land (704 Program), Department of Housing and Urban Development. Section 704 of the Housing and Urban Development Act of 1965 as amended authorizes grants to assist state and local governments in acquiring land needed in the future for any public purpose. The primary objec-


EPA Regions
ALASKA
HAWAII
AMERICAN SAMOA
GUAM
TRUST TER. OF PACIFIC ISLANDS
WAKE ISLAND
PUERTO RICO
VIRGIN ISLANDS
I
II
III
IV
V
VI
VII
VIII
IX
X
Seattle
San Francisco
Denver
Kansas City
Dallas
Chicago
Atlanta
Phila.
N.Y.
Boston
D.C.
WASHINGTON
OREGON
IDAHO
MONTANA
WYOMING
CALIFORNIA
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
MINNESOTA
IOWA
MISSOURI
TEXAS
OKLAHOMA
ARKANSAS
LOUISIANA
WISCONSIN
MICHIGAN
ILLINOIS
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISS.
ALABAMA
GEORGIA
FLORIDA
S. CAROLINA
NORTH CAROLINA
VIRGINIA
W. VIRGINIA
MD.
DEL.
NEW JER.
PENNSYLVANIA
NEW YORK
CONN.
MASS.
VT.
NH
MAINE

tive of this program is to save money by acquiring future sites before land prices increase, or the land is developed for other purposes. The grant covers the direct costs of property acquisition plus indirect costs such as condemnation proceedings, appraisals, title evidence, documentary taxes, and recording fees. The proposed use of the land must be undertaken within five years of acquisition. These funds might be used to acquire disposal sites.

Open Space Land Program, Department of Housing and Urban Development. The Housing and Urban Development Act of 1965 amended the Open Space Land Program to provide increased aid to local governments for acquiring and developing urban open space lands, and for creating small parks in built-up areas. The act authorizes grants up to 50 per cent of the project cost.

Disposal sites could be made into valuable community assets such as parks and recreation areas. However, to receive assistance under this program, local officials must state beforehand that the end use of such sites will be open space.

Farmers Home Administration, Department of Agriculture. The Farmers Home Administration (FHA) of the Department of Agriculture (USDA) offers loans and grants to local governments and nonprofit organizations for the construction of rural solid wastes disposal sites. Grants cannot exceed 50 per cent of the development cost. FHA financial assistance is available to communities of less than 5,000 population, but this may be broadly interpreted to include part of a metropolitan area. FHA grants or loans may be used to purchase land and equipment, to construct facilities, and to pay engineering and legal costs.

Economic Development Administration, Department of Commerce. The Public Works and Economic Development Act of 1965, administered by the Economic Development Administration (EDA) of the Department of Commerce, offers grants and loans in areas of high unemployment for public works; long-term, low-interest business development loans; and technical assistance grants for project planning and studies evaluating the needs of such areas.

Eligible public works projects can receive direct grant assistance up to 50 per cent of project costs. For example, if local officials could show that a solid wastes management system would be an incentive to attract industry and provide long-term employment opportunities, the project might be eligible.

EDA also provides supplementary grants to reduce the nonfederal share required by other grant-in-aid programs.

Bureau of Outdoor Recreation, Department of the Interior. The Bureau of Outdoor Recreation (BOR) of the Department of the Interior administers the Land and Water Conservation Fund Act, which authorizes 50 per cent matching grants to state and local governments to acquire and develop public outdoor recreation facilities. To qualify, a project must be in accord with the statewide outdoor recreation plan. Local officials seeking assistance to convert wastes disposal sites into parks should contact their BOR state liaison officer.

soil and geologic condition information

Technical information concerning soil and geologic conditions is available from two federal agencies.

Soil Conservation Service, Department of Agriculture. The Soil Conservation Service (SCS) of the Department of Agriculture works with landowners and local governments through local soil and water conservation districts to assure that the best possible use is made of land and water resources.

Local SCS soil survey information reports and sometimes

federal funds stimulate countywide planning

Cascade County and Great Falls, Montana

Officials of Cascade County and Great Falls, Montana, agreed that a comprehensive approach was required to solve their solid wastes collection and disposal problem. Early in 1967, a study grant of $38,000 was awarded to the county (population 80,000) by the Bureau of Solid Waste Management to determine the most efficient and economical methods to store, collect, and dispose of solid wastes. The study was conducted by an engineering firm under the supervision of the city-county health department in cooperation with municipalities surrounding Great Falls. An advisory committee of county, city, and town officials was formed to keep everyone appraised of the study findings and possible recommendations.

A comprehensive solid wastes management report was completed in September, 1968. It recommended that eight new sanitary landfill sites be established for the county, with two of them serving Great Falls; and that the county be divided into two or three collection areas.

To fully implement the recommendations, additional legal authority may have to be obtained from the state legislature.

technicians are available to help local officials select suitable disposal sites. To determine whether a soil survey report has been published for a particular county, officials should check with the county extension agent, or local Soil Conservation Service Office.

Geological Survey, Department of the Interior. Technical information to assist in selecting disposal sites is also available to local governments from the Geological Survey of the Department of the Interior. Specially requested water, mineral, and mapping investigations are conducted in cooperation with state or local governments and financed on a 50-50 basis.

land improvement

Limited funds are available to local governments to improve and beautify their lands.

Urban Beautification and Improvement Program Department of Housing and Urban Development. The Urban Beautification and Improvement Program of the Department of Housing and Urban Development provides grants not to exceed 50 per cent to state and local governments to improve and enhance lands in urban areas. Elimination of unsightly disposal sites in suburban and urban counties could be assisted under this program. Beautification and improvement activities must take place on public lands, have significant long-term benefits, and be important to the planned development of the community.

Bureau of Public Roads, Department of Transportation. The Bureau of Public Roads (BPR) of the Department of Transportation offers financial assistance to state highway departments for screening or removal of junkyards adjacent to designated federal-aid interstate and primary highway systems—more than 250,000 miles of roads.

As of mid-1968, 39 states had enacted legislation to control existing and future junkyards and automobile graveyards. Local officials can secure information from their respective state highway departments on screening, relocating, or removing junkyards.

federal lands

Many federal agencies own lands in various parts of the country which may be available for solid wastes disposal sites.

Forest Service, Department of Agriculture. The Forest Service of the Department of Agriculture administers over 186 million acres and can assist local officials in locating wastes disposal sites and access roads on these government forest lands. Local officials should contact the district ranger or forest supervisors regarding the details of special use permits.

Bureau of Land Management, Department of the Interior. Public lands administered by the Bureau of Land Management (BLM) of the Department of the Interior may be available to local governments, particularly in the western states, for solid wastes disposal sites. Information about the amount of land which may be leased in any one year, the conditions under which leases are issued, and other procedures may be obtained from BLM's state and district offices.

Office of Surplus Property Utilization, Department of Health, Education and Welfare. The Office of Surplus Property Utilization in HEW is authorized to transfer federal real property to states and local governments and nonprofit institutions for use in approved health or educational programs, including solid wastes management. If the property is to be used primarily for health or

Junked autos are one of our major solid wastes disposal problems in all areas of the country. Federal grants have been made to help finance projects looking into new and more economical salvaging of junked autos, while other grants have been made to shield auto graveyards from the surrounding areas.

TABLE I

PROGRAM APPLICATIONS REQUIRED TO BE SUBMITTED TO AN AREAWIDE PLANNING AGENCY FOR REVIEW AND COMMENT UNDER SECTION 204 OF P.L. 89-754 *

* As contained in Bureau of the Budget Circular A-82 Revised, dated December, 1967.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
- Open space program
- Public facility loans
- Public works planning
- Urban planning assistance
- Advance acquisition of land

DEPARTMENT OF THE INTERIOR
- Outdoor recreation

DEPARTMENT OF TRANSPORTATION
- Highway landscaping and scenic enhancement

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
- Solid waste disposal

DEPARTMENT OF AGRICULTURE
- Rural water and waste disposal facilities and planning

DEPARTMENT OF COMMERCE
- Public works and economic development facilities

education, it can be obtained without cost. HEW regional representatives can determine whether suitable property is available.

manpower training

Funds from the Department of Labor may be used to employ people temporarily in local government solid wastes projects. Local and state governments may sponsor these programs. The federal government can pay up to 90 per cent of project costs; the local sponsors' share may be in cash or in kind.

Neighborhood Youth Corps, Department of Labor. The Neighborhood Youth Corps (NYC) program for unemployed youth 16 to 22 years old finances projects which will contribute to the conservation, development, or management of a community's natural resources. Local and state governments or private nonprofit organizations may sponsor NYC programs. Pride, Inc., funded under this program, hired unemployed youths to clean up littered streets and alleys in Washington, D.C.

Adult Work-Training Experience, Department of Labor. The Adult Work-Training Experience program, known as "Operation Mainstream," was established to provide work training and employment projects for adults 22 years of age or older who are chronically unemployed and who have an annual family income below the poverty level. A project in Allegany County, Maryland, used Operation Mainstream participants to provide supplemental labor at a sanitary landfill site.

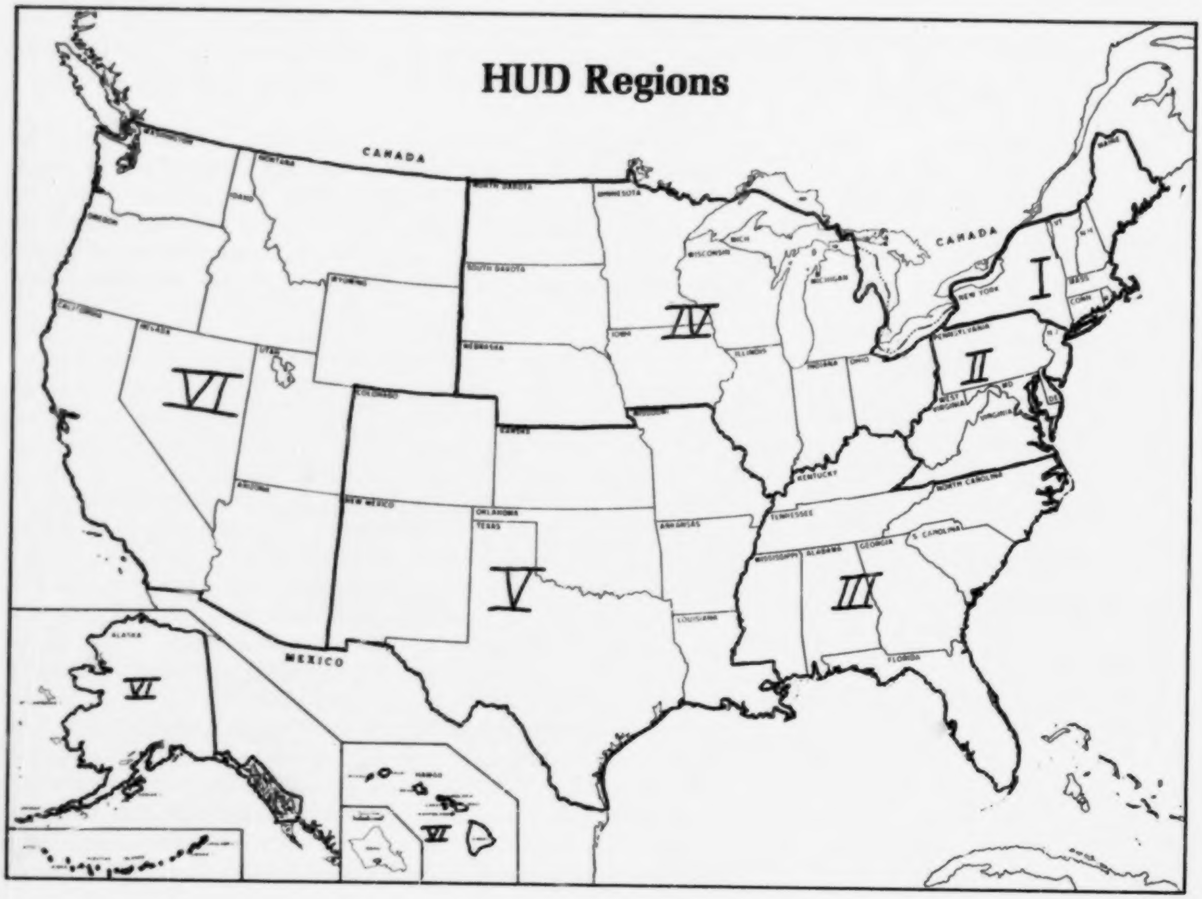
New Careers Program, Department of Labor. The New Careers Program must be sponsored by a local community action agency, and is designed to provide new career opportunities for persons over 22 years old. Under a local solid wastes project, people could be trained to fill sub-professional or semi-technical positions. Salaries are supplemented by federal funds.

grant review in metropolitan areas

A number of grant programs administered by various federal agencies must be reviewed by an areawide planning agency under Section 204 of the Model Cities and Metropolitan Development Act of 1966. This areawide planning agency, primarily composed of, or responsible to, elected local officials in the area, reviews these programs to determine whether they are consistent "with comprehensive planning developed or in the process of development. . . ." Table I lists some of the programs which require review under Section 204.

state assistance

Most states have a designated solid wastes management agency, usually the state health department. Many states provide technical assistance to aid local solid wastes management plan-


HUD Regions
CANADA
CANADA
MEXICO
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
ARIZONA
COLORADO
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
MICH
MICHIGAN
ILLINOIS
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
S. CAROLINA
NORTH CAROLINA
VIRGINIA
WEST VIRGINIA
MD
DE
PENNSYLVANIA
N.J.
NEW YORK
VT
N.H.
MAINE
MASS
CONN
ALASKA
HAWAII
I
II
III
IV
V
VI
VI
VI

ning. The assistance ranges from consultation to actual survey and development of a local program plan.

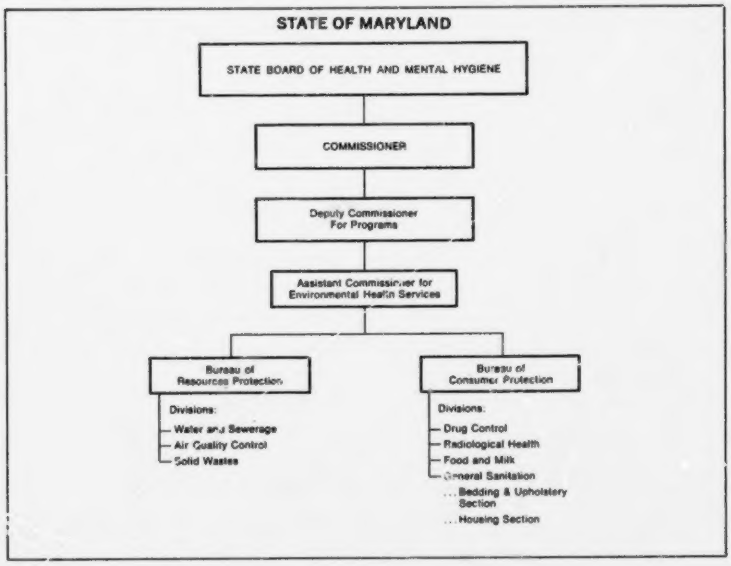
New York provides technical and limited financial aid for local governments to plan for the collection, treatment, and disposal of solid wastes. During 1968, the New York legislature appropriated $250,000 for 100 per cent planning grants. Counties, part-county areas, and regions encompassing several cities, towns, or villages are eligible.

New York State Department of Health regulations provide for close collaboration between the state health commissioner and local governing bodies on the selection of engineers, study outline, and contracts. The studies must include broad estimates of future needs, population growth, and construction costs; the area to be serviced by units of an integrated system; financing requirements; and operating and maintenance costs. The study is not to include detailed engineering work on any specific plants or other units of the system.

The state health commissioner may contract to have a comprehensive study made for an area where, in his opinion, such a study is needed and a cooperative venture between municipalities is not advanced. In such cases, the chief executive officers of the municipalities included within the study area constitute an advisory committee to the commissioner for the study.

The South Carolina State Board of Health is preparing study reports for individual counties. The local solid wastes study plan includes a statement of purpose, an inventory of disposal areas, existing solid wastes production and disposal practices, and recommendations for local officials. Each study plan contains a map of the study area plus diagrams of methods of operating sanitary landfills.

The California state agency primarily involved with solid wastes is the Bureau of Vector Control and Solid Waste Management in the Department of Public Health. This bureau's activities include providing consultation and program assistance to public and private agencies; demonstration and evaluation of improved techniques and methods of handling solid wastes; planning; train-


STATE OF MARYLAND
STATE BOARD OF HEALTH AND MENTAL HYGIENE
COMMISSIONER
Deputy Commissioner For Programs
Assistant Commissioner for Environmental Health Services
Bureau of Resources Protection
Divisions:
Water and Sewerage
Air Quality Control
Solid Wastes
Bureau of Consumer Protection
Divisions:
Drug Control
Radiological Health
Food and Milk
General Sanitation
...Bedding & Upholstery Section
...Housing Section

federal funds for areawide planning

Des Moines, Iowa

The two-county metropolitan area of Des Moines, Iowa, contains almost 290,000 people. Most of the local governments in the area individually offer separate services for the collection and disposal of garbage and trash.

In 1967 Des Moines received a grant from the Bureau of Solid Waste Management of almost $73,000 (total cost of $109,000) to make a one-year study of the metropolitan area's future solid wastes collection and disposal needs. The study was conducted jointly by two engineering consulting firms in cooperation with the area local governments. The study included an analysis of the amount and type of solid wastes generated, methods and costs of collection and disposal, existing laws, and existing administrative procedures.

The study report recommended the establishment of a regional solid wastes agency to administer the collection and disposal of solid wastes for the entire metropolitan area. The board of this agency would consist of one elected official from each of the 14 local governments. A weighted voting system was proposed which would give one vote to each local government plus one additional vote for each 50,000 people represented. The City of Des Moines would have five votes. Although state law permits joint agreements between local governments to form regional agencies, it may not be legally possible for the regional agency to have the power of eminent domain. If this is true, the report recommends that the City of Des Moines purchase the land and lease it back to the agency.

Since the study findings have been reported, elected officials of the area governments have been meeting and discussing the recommended plan along with various alternatives proposed in the report. There is a clear recognition that solid wastes is a problem requiring regional cooperation and it appears that there is a definite desire on the part of the area governments to solve this problem.

ing; conducting surveys and inventories to assist local agencies in defining solid wastes problems and recommending courses of action; and conducting special investigations of specific solid wastes problems. In September, 1968, California presented an interim report on the existing status of solid wastes management. The second part of the report, including recommendations for a comprehensive statewide program, will be presented to the state legislature in 1969.

The Maryland solid wastes program is conducted by the state Department of Health Bureau of Resources Protection, Division of Solid Wastes. The objectives of the statewide solid wastes management program are as follows:

1) improve existing solid wastes management practices;
2) prepare enabling legislation, including establishment of a program for disposing of worn-out automobiles, farm machinery, and other obsolescent items;
3) conduct solid wastes research, investigations, and demonstrations (see Allegany County, Maryland, Field Report);
4) plan a training course for local solid wastes technicians;
5) plan financial assistance programs for local governments;
6) enforce recently passed statewide open burning law;
7) assist local governments in developing solid wastes plans; and
8) prepare a statewide solid wastes plan.

other information sources

A few universities are participating in community demonstration projects. Public officials should not overlook universities for technical assistance when planning and implementing a solid wastes management system.

Technical information is also available to local officials from collection and disposal equipment manufacturers, as well as from trade magazines or public works journals.

Organizations with information on solid wastes are:

American Public Works Association
1313 East 60th Street
Chicago, Illinois 60637

National Solid Wastes Management Association
1022 15th Street, N.W.
Washington, D.C. 20005

Institute of Scrap Iron and Steel
1739 H Street, N.W.
Washington, D.C.

National Refuse Sack Council
60 East 42nd Street
New York, New York 10017

Keep America Beautiful, Inc.
99 Park Avenue
New York, New York 10016

National Clean Up, Fix Up, Paint Up Bureau
1500 Rhode Island Avenue, N.W.
Washington, D.C. 20005

American Society of Civil Engineers
345 47th Street
New York, New York 10017

Glass Container Manufacturers Institute
1511 K Street, N.W.
Washington, D.C. 20005

Incinerator Institute of America
60 East 42nd Street
New York, New York 10017

Institute for Solid Wastes
1755 Massachusetts Avenue, N.W.
Washington, D.C. 20036

Commercial salvaging of junked autos is on the decline, but federal grant money is being used to study new means of reclaiming and utilizing materials in junked autos.

summary

Technical assistance from federal, state, and private sources is available to local officials to develop or expand their solid wastes management systems. On the federal level, the primary source of financial and technical assistance is the Bureau of Solid Waste Management; although the Bureau of Mines provides limited technical assistance, its main emphasis is on research. Imaginative use of assistance from other federal agencies may provide help for solid wastes management.

Many states are beginning to provide technical assistance, particularly in the planning field. At present, almost no financial assistance is available.

The solid wastes industry, universities, and private organizations also can provide information and assistance.

In Kent County, Grand Rapids, Mich., most of the rural collection and disposal is conducted by private operators with little regulation by local government. The county is seeking to establish a countywide system of regulation for disposal areas such as this one.

appendix

ADDRESSES OF MAIN AND REGIONAL OFFICES OF FEDERAL DEPARTMENTS OFFERING ASSISTANCE IN SOLID WASTES MANAGEMENT

BUREAU OF SOLID WASTE MANAGEMENT

Environmental Control Administration
Consumer Protection and Environmental Health Service
Department of Health, Education and Welfare

REGIONAL PROGRAM CHIEFS

Region I — John Fitzgerald Kennedy Building, Boston, Massachusetts 02203 (New Hampshire, Maine, Rhode Island, Vermont, Massachusetts, Connecticut)

Region II — Room 8344, Federal Office Building, 26 Federal Plaza, New York, New York 10017 (Delaware, New Jersey, New York, Pennsylvania)

Region III — 220 Seventh Street, N.E., Charlottesville, Virginia 22901 (District of Columbia, Kentucky, Maryland, North Carolina, Virginia, West Virginia, Puerto Rico, Virgin Islands)

Region IV — Room 404, 50 Seventh Street, N.E., Atlanta, Georgia 30323 (Alabama, Florida, Georgia, Mississippi, South Carolina, Tennessee)

Region V — Room 712, New Post Office Building, 433 West Van Buren Street, Chicago, Illinois 60607 (Illinois, Indiana, Ohio, Michigan, Wisconsin)

Region VI — Federal Office Building, 601 East 12th Street, Kansas City, Missouri 64106 (Iowa, Kansas, Missouri, Minnesota, Nebraska, North Dakota, South Dakota)

Region VII — 1114 Commerce Street, Dallas, Texas 75202 (Arkansas, Louisiana, New Mexico, Oklahoma, Texas)

Region VIII — 9017 Federal Office Building, 19th & Stout Streets, Denver, Colorado 80202 (Colorado, Idaho, Utah, Montana, Wyoming)

Region IX — Federal Office Building, 50 Fulton Street, San Francisco, California 94120 (Alaska, Arizona, Guam, Washington, Nevada, California, Hawaii, American Samoa, Oregon)

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County Development Coordination Manual, National Association of Counties Research Foundation, 1001 Connecticut Avenue, N.W., Washington, D.C. 20036, 1968. Price: $2.

Demonstration Project Abstracts, Bureau of Solid Waste Management, U.S. Department of Health, Education and Welfare, reprinted 1968.

Demonstration Project Abstracts: Supplement A, Bureau of Solid Waste Management, U.S. Department of Health, Education and Welfare, 1967.

Grant Programs Under the Solid Waste Disposal Act, Bureau of Solid Waste Management, U.S. Department of Health, Education and Welfare, 1968.

Handbook for Local Officials, Office of the Vice President, U.S. Government Printing Office, 1967. Price $2.

Lefke, L. W., comp, *Summaries of Solid Wastes Research and Training Grants*, Public Health Service Publication Number 1596, U.S. Government Printing Office, 1968.

Solid Waste Demonstration Grants, Bureau of Solid Waste Management, U.S. Department of Health, Education and Welfare, 1968.

Solid Waste Disposal Act, Title II of P.L. 89-272, 89th Congress, S. 306, October 20, 1965, Bureau of Solid Waste Management, U.S. Department of Health, Education and Welfare, reprinted 1968.

Sponagle, C. E. (ed), *Summaries: Solid Wastes Demonstration Grant Projects —1968*, Public Health Service Publication Number 1821, U.S. Government Printing Office, 1968.

State/Interstate Solid Waste Planning Grant Listing, Bureau of Solid Waste Management, U.S. Department of Health, Education and Welfare, 1968.

Vaughan, R. D., and R. J. Black, *The Federal Solid Wastes Program: A Progress Report*, Bureau of Solid Waste Management, U.S. Department of Health, Education and Welfare, 1968.

REGIONAL OFFICES
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Region I	346 Broadway, New York, New York 10013 (Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont)
Region II	630 Widener Building, Chestnut and Juniper Streets, Philadelphia, Pennsylvania 19107 (Delaware, District of Columbia, Maryland, New Jersey, Pennsylvania, Virginia, West Virginia)
Region III	645 Peachtree—Seventh Building, Atlanta, Georgia 30323 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)
Region IV	Room 1500, 360 North Michigan Avenue, Chicago, Illinois 60601 (Illinois, Indiana, Iowa, Michigan, Minnesota, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin)
Region V	Federal Office Building, 819 Taylor Street, Room 13-A-01, Fort Worth, Texas, 76102 (Arkansas, Colorado, Kansas, Louisiana, Missouri, New Mexico, Oklahoma, Texas)
Region VI	450 Golden Gate Avenue, San Francisco, California 94102 (Arizona, California, Guam, Hawaii, Nevada, Southern Idaho, Utah, Wyoming) Area Office: 909 First Avenue, Seattle, Washington 98014 (Alaska, Montana, Northern Idaho, Oregon, Washington)
Region VII	Ponce de Leon Avenue and Bolivia Street, P.O. Box 1105 Hato Rey, Puerto Rico 00919 (Puerto Rico and Virgin Islands)

Solid Wastes Research Program, Manager
Bureau of Mines
U.S. Department of the Interior
19th and C Streets, N.W.
Washington, D.C. 20240

Farmers Home Administration (FHA)
Forest Service
Soil Conservation Service (SCS)
Department of Agriculture
14th and Independence Avenue, S.W.
Washington, D.C. 20202

Bureau of Outdoor Recreation (BOR)
Bureau of Land Management (BLM)
Geological Survey
National Park Service
Department of the Interior
19th and C Streets, N.W.
Washington, D.C. 20240

Neighborhood Youth Corps (NYC)
Adult Work Training Programs
New Careers Program
Director, Office of Manpower Information
Department of Labor
14th and Constitution Avenue, N.W.
Washington, D.C. 20210

8 citizen support

citizen support

BUT OFFICER — I DIDN'T KNOW IT WAS SUPPOSED TO BE COVERED —
THERE'S NO EXCUSE

This cartoon sign outside the entrance of a Los Angeles County sanitary landfill helps make solid wastes regulations more palatable for the ordinary homeowner.

actions speak louder than words

Local government must plan a public information strategy to achieve long- and short-range goals and select tactical steps to achieve them. To win citizen support local government should begin to build a visible record of accomplishment by making improvements even while the total solid wastes management system is still in the planning stages.

program image The image presented by solid wastes management directly influences community attitudes. In most communities, the collector is one regular contact a resident has with local government.

a professional public awareness campaign

Broome County, New York

"People think disposal ends at the curb."

"The people in Broome County just equated sanitary landfill with dump."

These comments were made by Broome County, New York, supervisors after three years of trying to educate the public about needed solid wastes disposal. So the Board of Supervisors decided to secure the help of a professional public relations firm. The firm presented the county with a proposed education and information campaign which combined the use of the news media, public meetings with elected and appointed county officials, and a citizens committee.

The program has been followed with the exception of the citizens committee. County officials opposed the formation of a citizens committee at that time for two reasons: 1) several supervisors preferred to have the citizens committee chosen after landfill sites had been selected and announced; and 2) the director of environmental health services thinks citizens committees should not be countywide, as the disposal program will be, but should be organized independently in several localities.

About $16,500 was budgeted for out-of-pocket expenses. Some financial assistance was received from the Bureau of Solid Waste Management. Nearly half—$7,676—of the $16,500 budget was used to purchase time and space in two daily newspapers, three television stations, and four radio stations. Producing the materials for these media cost about $2,600.

Another $2,500 was spent for 60,000 copies of an eight-page brochure called "Cover-up," which picked up the key phrase used throughout the information campaign: "Sanitary Landfill . . . the Better Way."

Preparation of a slide show and written commentary about sanitary landfill cost about $500, with another $200 going for a projector and screen.

The public relations agency fee for its professional services was $1,500. It worked under the director of environmental health services and the planning director.

There has been some criticism of the county for using public funds to hire a public relations firm. But the chairman of the board said he is pleased with the response to the program so far, and added, "Where it affects public health or safety, we are willing to spend some money for a public education and information program." And since Broome County has no information officer of its own, the only way to obtain professional information help is by using an outside firm.

The folder and the slide show were made available to service clubs throughout the county, to schools, and to residents in the areas where the county anticipated locating landfills. In addition, members of the Board of Supervisors, the planning director, and the director of environmental health services met with residents; appeared at local public hearings to explain the countywide disposal program; and discussed the program with officials of the towns and villages to show them its advantages and to answer objections.

There has been opposition from nearby residents to some of the landfill sites selected and strenuous opposition from town officials to one site. Even the resulting controversy over that site, however, has created one plus for the county, its chairman believes: Many residents discovered that an ugly open dump already existed in their town.

The uniform he wears, his ability to deal with people, his conscientiousness, and his courtesy influence public attitudes.

Collection vehicles also present an opportunity to improve public attitude. In Philadelphia, each month the polished chocolate enamel compactor trucks display different posters on such

winning support for improved collection

Tucson, Arizona

Prior to 1963, Tucson, Arizona, solid wastes collection was provided by various local haulers under district contracts with the city. Under this system, city residents were not receiving adequate service and the city could not exercise any degree of control over the situation. In September, 1963, the city decided to take over solid wastes collection. To operate an effective system of solid wastes collection, the city had to upgrade the existing local ordinances for solid wastes collection. Based on a study of other local ordinances around the country, proposed legislation provided that residents must comply with certain standards for the storage of solid wastes or be guilty of a misdemeanor. This provision in the proposed ordinance caused considerable public concern and threatened to block passage of the needed regulations.

The Refuse Division of the Department of Public Works contacted the city newspaper to explain the inadequacies of the existing law. The newspaper cooperated by giving full support to the new ordinance. In addition, local television stations agreed to present a program explaining the new ordinance and its implications.

While the public works department had obtained the necessary support for the new ordinance, there still remained the task of implementing the new system. Without the full cooperation of residents, the new collection system could not succeed. Recognizing that most residents would voluntarily comply with the new regulations, the Department of Public Works developed a series of brochures to explain the need for the new system in laymen's language illustrated by cartoons. Although there was no general distribution of the brochures, they were given in quantity to groups such as the Chamber of Commerce, Welcome Wagon, and to persons who made complaints about the service.

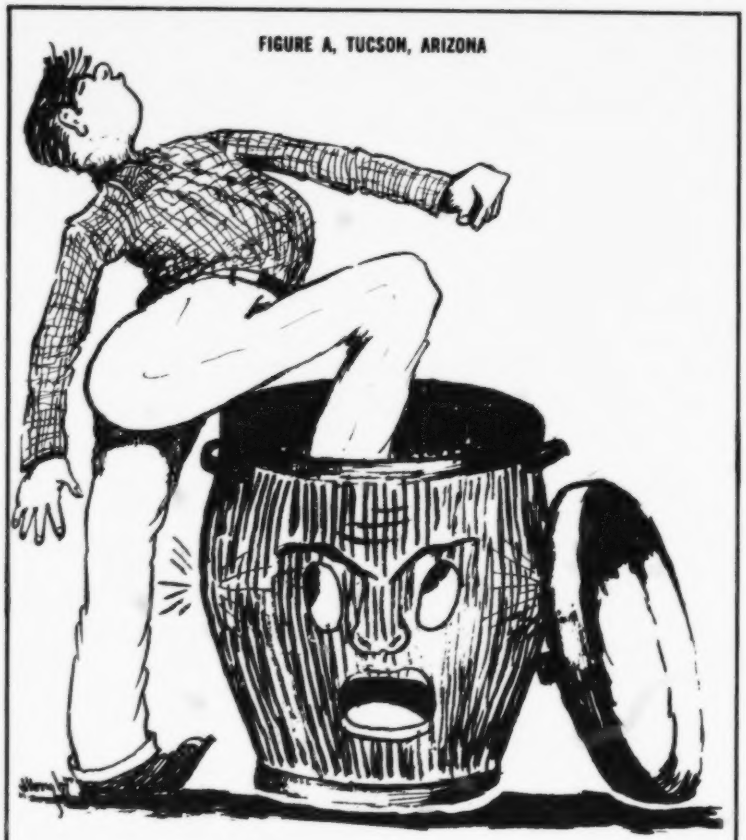
The cost of developing and printing the brochures, as well as the cost for all public relations for Tucson's Sanitation Department, was minimal. The total budget for the Sanitation Department for 1967 was approximately $1.9 million, of which $1,700 was spent on public relations. The public relations expenditure represents less than 1 per cent of the total budget, but the time it saves in dealing with complaints represents a significant cost savings.

subjects as storage standards, traffic safety, and community relations.

Every disposal or processing facility offers opportunity to improve the solid wastes management image. A fenced, landscaped, well-designed operation makes it easier to secure a location for another well-run operation when it becomes necessary. Officials should not miss the opportunity to remind residents that landfills are land reclamation projects which may result in a park, golf course, or airstrip. This idea is a strong selling point. In Riverside, California, one sanitary landfill site was developed to create a scenic parklike atmosphere along the entrance road.

Signs clearly indicating regulations and hours of operation are necessary. They should be easy to read, easy to find, and

FIGURE A, TUCSON, ARIZONA



As a member of a City Garbage crew, I have been given very careful instructions not to bang your garbage cans, but to treat them with tender loving care. But in order for me to follow these instructions and still empty your garbage cans, your cooperation is needed. If you fill the cans and then stuff in some more trash and jump on it in order to get the lid on, the garbage won't fall out when I turn over your can to empty it.

I am not allowed to reach in the can and pull garbage out with my hands. I can't tell when I will grab a broken bottle, old razor blades, jagged tin can lids or other dangerous things, and if I am hurt, you have to pay for it. Industrial accidents are expensive to taxpayers. So, please don't cram your garbage can full; get another one if you feel you often need more room.

attractive. A facility which is difficult to locate should have conspicuous direction signs en route.

Once an illicit roadside dump has been cleaned up, the appearance of the area should be improved so it will not revert to a dump. An easy way to do this is to plant grass on the clean but barren dump site.

handling complaints

An excellent opportunity to improve community relations is through the prompt, courteous, efficient handling of citizen complaints. One of the most frequent complaints is failure to provide a scheduled collection service. With contract collectors in Montgomery County, Maryland, the home missed must receive service within one day of a complaint; and the contract collector may not have more than 25 such complaints a month without being fined or subject to contract cancellation.

National Disposal Contractors, Inc., requires collectors to make a notation of any homes which were skipped and why—no waste to be collected, aggressive dog, improper storage, item too large. When the complaint is received, the company is able to explain why service was not rendered, and tell the resident how to remedy the situation so that it will not happen again. Then a special pickup is made.

A record of the kind and frequency of complaints should be kept so that continuing improvements can be made. In New York City, with a fleet of 1,200 trucks, one repeated complaint was that trucks were too noisy. The mayor now requires all trucks to be provided with insulation to reduce the noise level.

going to the public for support

established organizations

Resources in the Community. One method of achieving citizen participation in the early stages of a program to improve solid wastes management is the formation of a small citizens advisory group. The role of this committee should be to help plan total citizen support for whatever solid wastes management system is needed.

PROGRAM SALESMANSHIP BY THE CITIZENS ADVISORY COMMITTEE

1. BELIEVE in the program.
2. KNOW the program thoroughly.
3. PRESENT the program attractively.
    a. Gear the presentation to the particular audience to hold its interest.
    b. Do not force a decision at the first visit, but leave the impression that the first visit was more than a "friendliness" session.
4. FOLLOW UP the initial visit.

The starting point of a public support campaign is to identify the community assets and liabilities which may affect the solid wastes program. To do this, the advisory committee should include both elected and non-elected community leaders. The committee should include the local government public information officer, representatives from other local government departments, community organizations, and private industry.

The best way to get *action* is to get people involved early. Forming a broadly based committee early is vital since people may feel they are being "used" if they are asked to go along after the plan is made. This way, comprehensive improvements will be those which the citizens themselves have helped develop.

A workshop is an efficient way to prepare a large group quickly. Citizens advisory committee members should help plan the workshop and determine what decisions and participation are required from their organization. The committee should prepare a composite list of private organizations, professional associations, private industries, and agencies of local, state, and federal governments. Working with the citizens committee, public officials should decide which interest groups need to be reached, what factors are important to each group, and what results are desired.

Since many organizations are committed to other goals as primary responsibilities, at first an official should select organizations which are most likely to participate with enthusiasm. After a record of accomplishment has been achieved, other organizations will be eager to participate and help support the solid wastes management program.

Existing organizations can effectively motivate interest since they have established channels of communications and influence with their members.

Each civic group, such as the League of Women Voters, U.S. Jaycees, parent-teacher associations, Lions Club, and Kiwanis,

mobilizing community resources to promote public acceptance

Madison County, Alabama

Piecemeal, sporadic efforts by Madison County, Alabama, commissioners to eliminate unsightly accumulations of trash and garbage at roadside areas, woodlands, and ditches within their individual districts proved unsuccessful. The county commissioners became convinced that a coordinated countywide program of solid wastes disposal for rural areas was the only solution.

County health officials contacted equipment manufacturers, visited systems in other cities and counties, and sought the opinions of various community leaders and organizations on the workability of plans being formulated.

Health officials proposed that residents of areas to be served contribute funds to purchase 40 8-cubic-yard metal containers to be placed at principal intersections, near rural population concentrations along county roads, near rural stores, and on county school grounds. The county would purchase a front-end loading compaction truck, employ the necessary collection crew, and assume operating expenses. The Huntsville City Council agreed to allow Madison County to use its disposal site free.

To help sell the program to rural communities and obtain public financial support, the health department enlisted rural community leaders and presidents of organizations such as home demonstration clubs, farm bureaus, and parent-teacher associations. These key leaders were invited to attend a briefing about the proposed solid wastes program where slides, maps, flip charts, a movie about collection, and other visual aids were used. A person in each community represented was asked to arrange similar meetings for citizens in his area.

At the first such local-level meeting, the chairman of the Board of Commissioners presented the proposal. A permanent fund-raising chairman was elected, who immediately appointed a committee to solicit contributions. Within three days, $1,600 for three containers was collected.

Following this initial success, the same procedure was used in each small incorporated town and unincorporated community. Within two weeks over $10,000 had been received. Considering this adequate evidence of public approval, the commissioners ordered the 20-cubic-yard packer truck.

According to the sanitarian supervisor, a key element in gaining public support was working closely with the Agricultural Extension Service:

> *It would have been impossible to have put this program across without the assistance of the local county agent and home demonstration agent. These people can tell you more than just how to raise a row of cotton or how to prepare a balanced meal; they know who the leaders are in a community and how to obtain their cooperation and support. And these agents are available in counties throughout the country to help local officials in worthwhile projects of this type.*

Local officials in Madison County feel that the most important aspect of this solicitation program was that every member of each community was contacted and encouraged to give something, however small. This created a sense of pride, possession, and ownership in the containers and the cleanliness of their neighborhood.

Within six years, 84 containers and two compactor trucks were in use.

adopts one or two major projects for the year. The citizens committee should work with each organization to encourage the adoption of solid wastes management as a project and to get the organization to participate in the overall program. Each organization should be shown how its contribution fits into the overall action program.

The citizens committee should enlist an organization's active participation, not settle for a token endorsement. The organizations should show they plan to involve all their members in the project and designate a liaison with the citizens committee. Involvement can itself generate enthusiasm.

Some projects which can be adopted by individual organizations are litter control, improving storage conditions (buy a new trash can campaign), and abandoned automobile removal. The project should be a manageable one so that it can be accomplished within the time allotted, and challenging enough to generate enthusiasm, not boredom.

Another important group that should be approached for assistance in getting the message across is the public school system. There are local teachers' organizations virtually everywhere and through them the teachers can be reached, by getting articles printed in their newsletters and by providing speakers at their meetings. School boards should also be approached; with their permission and that of school administrators, school children themselves can be enlisted to help.

Each organization should be informed of the activities of other groups, and should be given public recognition for its participation through newspaper articles, citations, competitive awards for outstanding achievement, and other methods.

using leadership and example to win support

Waukegan, Illinois

When rats from the city dump invaded nearby prosperous residential areas, the citizens vociferously demanded that a municipal incinerator be built to replace the dump. A $350,000 incinerator bond referendum was approved, but public interest waned when two years passed with no action taken. In 1961, the newly elected mayor reviewed the problem. In the two-year span, the solid wastes production rate had increased and construction costs had skyrocketed. The bond issue was no longer adequate to pay for an incinerator large enough to meet current needs, much less accommodate future growth, and the city was already facing financial strains.

To find an alternative solution, the mayor interviewed private land disposal operators and toured their sanitary landfill sites. Waukegan was surveyed and soil tests were run on the most suitable sites. On the edge of Waukegan, a 3-acre swamp had been a community eyesore for many years. Tests indicated it to be suitable for sanitary landfill without endangering surface or ground water. Arrangements were made to have the land donated to the city in memory of the owner's deceased son. National Disposal Services, Inc., was contracted with to operate the small pilot sanitary landfill under strict standards, and also to assume the waste collection service which, under municipal operation, had been unsatisfactory.

The public, having approved a bond issue for incineration, raised strong opposition, claiming that the city was planning to "replace the dump with a dump." Court action ensued. The mayor personally waged a vigorous campaign defending the selection of the sanitary landfill method. Appearing before hostile audiences, he argued that sanitary landfill was much less expensive than incineration, that land in Waukegan was available which could benefit from reclamation, and that the homeowner would receive more service (backyard pickup) than before at less cost. At one public meeting the audience was so rude and agitated, the mayor said, "Nothing will convince you because you don't want to listen. But you elected me to do what is right and I will establish a sanitary landfill—not a dump—whether you like it or not because it is best for the city. That landfill will be so clean and so perfect that when it is finished I'll serve you tea and crumpets on it. In fact, in 18 months we will have the biggest tea party there you have ever seen."

The newspapers had a field day cartooning the promised tea party in a rat-infested dump. When the first truckload of trash was brought to the new fill, citizens lined the fenced perimeter to superintend the operation. After a week, the crowd thinned and opposition was less adamant. Court injunctions were dropped.

Within 18 months the model landfill was completed, sodded, and equipped for little league baseball. On the appointed day, 5,000 Waukegan citizens gathered for the ribbon-cutting ceremony to celebrate the newly completed reclamation project. The party featured tea and doughnuts, a brass band, and exhibition baseball. Leading athletes from the Chicago sports world were honored guests.

For the next site, the school system and the park authority invited the city to reclaim eroded land by sanitary landfill for a school athletic field.

Resources Outside the Community. In addition to the resources within the community, technical and financial support is available from universities, the federal government, private industry, and national professional associations. (Details of these programs are presented in *Guide Number 7, Technical and Financial Assistance.*)

An official of the National Clean-Up, Paint-Up, Fix-Up Bureau, the oldest national nonprofit community improvement program, commented:

> The greatest obstacle to channeling enthusiasm for community betterment results because most communities do not know what they want to accomplish and what organizations are already available to help them once their goals are identified.

To show how to channel this community energy, the bureau offers a free kit on request and issues a monthly newsletter to keep communities abreast of projects throughout the country. It presents an annual national award to the community rated highest for the degree of improvement, beautification, youth participation, and scope of voluntary participation. For more information on this and similar programs, see the Appendix.

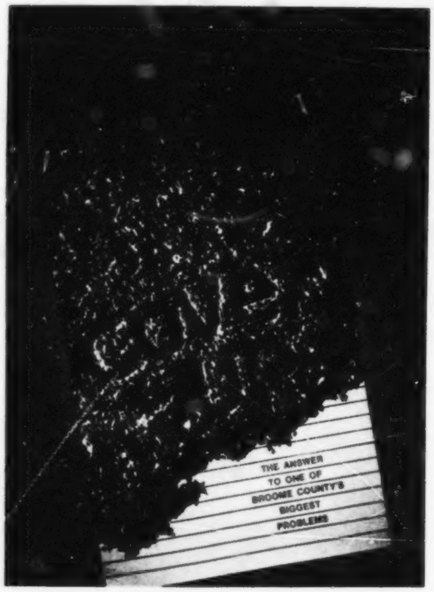
delivering the message

Public officials should plan a careful campaign to reach the general public. Improvements made by local government and the support and successful projects of civic organizations will pave the way for public support of a comprehensive solid wastes management program. All the tools of communication should be used to reach all citizens with the reasons why improvement is necessary.

Successfully selling a complicated proposal is most effective if personal explanations can be given. Small informal meetings or "coffees" where groups of citizens have a direct opportunity to learn about and discuss the program with their neighbors are the next best means.

Personal selling is most effective if the campaigners are well-known, respected, and informed. Community and civic leaders should be able to reach those who influence others at work and in the neighborhood.

The more complicated or controversial a program, the more personal contact is required to convince people that it is good. Completely changing someone's mind is obviously easier if his first opinion was not too deeply rooted. The environment, as well as the means and tact of the presentation, is important. When public hearings are required by law or are desirable, officials should plan and organize the meeting so that all sides receive a fair hearing.



Broome County, New York, used this brochure explaining why countywide disposal and sanitary landfill were the answers to their solid wastes problems.

Speakers Bureau. A well organized speakers bureau with effective, well-prepared speakers is important in any education campaign which must move people to action. It is not enough to tell members of an organization that solid wastes are being improperly managed and that improvements are needed. Because of the element of personal contact, which generally makes a deeper and more permanent impression than impersonal contact (through the printed word or over electronic waves), effective speakers are a must in a campaign for support of a solid wastes management program.

Speakers can be drawn from the ranks of elected and appointed officials, doctors, scientists, engineers, and knowledgeable citizens. They shold be vitally interested in solid wastes management and knowledgeable about local conditions. Their enthusiasm alone can be infectious. Bolstered with facts and a proposed program, they may move a majority of the audience to acceptance of the program. Though the audience may not be permanently motivated by one speech, its members will be far more receptive to future discussions about solid wastes management which reach them through the mass media. This is how mass communication and the personal contact of small group meetings work hand in hand.

Opportunities must be sought to expose the issues and provide information on the solid wastes management program. The citizens advisory committee or public officials should contact every organization to let them know that speakers are available. Speaking engagements must be sought actively. All kinds of women's clubs, PTA's, fraternal organizations, and church circles can be approached. Representatives from these organizations should be working with the citizens committee throughout the campaign, and they should be able to arrange speaking dates.

the direct attack

Baltimore County, Maryland

Baltimore County, Maryland, made a broadside attack on the litterer. The county issued a "Dirty Picture of the Week" pointing a finger at any dump anywhere. For example, one caption read:

> *SEEING IS BELIEVING —This horrible scene is on Milford Mill Road just west of Reisterstown Road near the well-kept suburban community of Sudbrook Park. This photo was taken and is released by the Office for Information and Research for Baltimore County to spotlight how a nice county road can be made unattractive by roadside littering. Don't dump unwanted bulky items along the county highways, when for such a small fee, the Bureau of Sanitation will pick them up. Call 823-3000, Extension 285.*

Program support was given from every level of local government. The elected county executive instructed every county employee to know the litter laws. Litter bags were put into all county vehicles, including police cars. Use was mandatory. An example was to be set.

Policemen had orders to warn any violators seen littering highways and to present offenders a litter bag with a polite reminder that next time an arrest might be in order. Appeals were made for responsible citizens to report violations promptly, to refuse to allow a few to raise tax burdens by thoughtless littering. Magistrates were asked to assign maximum penalties to all convicted violators.

Color television spots showed piles of debris along well-traveled roadways and streams. Next to "No Dumping" signs, they showed garbage, junk, and filth which clearly implied a lack of public pride or public responsibility. Messages were

More and more, solid wastes management agencies are making speeches at all local schools. The immediate benefit from this audience is that the children carry the talk home to their parents. The long-range benefit is that soon an entire generation of people will be familiar with solid wastes problems and more easily convinced of the need for good management.

The speaker should make sure his talk is appropriate to his audience. The local ladies' club will not be as interested in the technical aspects of industrial wastes as will, say, the local chapter of the American Society of Civil Engineers.

After initial speaking engagements have been fulfilled, the word will begin to reach other program chairmen, who are searching continually for good program material. Soon they will begin coming to the speakers.

The Creation of Events. To use organizations effectively and at the same time create increased public awareness through news media, the public education program can focus attention on special events.

The Philadelphia More Beautiful Committee received national recognition from the National Clean-Up, Paint-Up, Fix-Up Bureau.

brief and accusing: "You're looking at a wasteland of litter. . . . Keep it up. . . . You won't have to look for a dumping ground, you'll be living in one." Each spot ended with an invitation to telephone the county for information about disposing of unwanted items. Three television and 11 radio stations in the greater Baltimore metropolitan area broadcast the spots. Preparation cost of the spots was $201.60.

Another public information tool used was direct mail. Utilizing the July mailing of tax bills to save the substantial cost of an additional mailing, a special flyer was prepared and distributed as an insert. Titled merely "Information for Taxpayers," it summarized major expenditures of tax monies for the past year and featured basic information regarding bulky item and refuse disposal in a "specific report." It cost less than one-half cent per mailing and reached 180,000 homes.

Commenting on the educational action program, the county's sanitation bureau chief remarked:

> *After agreeing to the campaign outlined by our county Office of Information and Research, particularly my part in opening it with a two-fisted attack, I half expected to be hung in effigy, or worse, by any one or any number of the county's over 555,000 residents. But the hue and cry never began, thankfully, and aside from a few brickbats public reaction was highly favorable.*
>
> *We found . . . that many residents were as alarmed and upset as we were about wholesale dumping and were anxious to do something to help stop it.*

Since this reverse psychology was applied and the rest of the public information program has been in effect, record progress has been made in removing all kinds of debris from basements, backyards, vacant lots, and numerous other locations. In the first eight months, more than 3,800 bulky items were collected and hauled to landfills for proper disposal. Telephone requests for this service came in at the rate of 400 per week.

Another by-product of the campaign has been better telephone communication with people who have disposal problems. Residents are more aware that there is a solid wastes collection and disposal problem and they know it is important to them. They accept the regulations more readily and view them as necessary for convenience, health, and management. According to the Baltimore County information office, "We recommend this type of direct attack program to any local government with similar problems and an official willing to stick his chin out."

By organizing blocks and having them compete each week for a "Cleanest Block of the Week" award, the committee has succeeded in beautifying 2,500 blocks in the oldest part of the city. The program was closely coordinated with the Department of Streets so that bulky items and street sweepings could be picked up on Saturdays.

Keep America Beautiful, Inc., has been active in litter control. Its award program is an incentive to stimulate community action, and to tie local action into a nationwide effort. San Diego County, California, has won two Keep America Beautiful county awards for its anti-litter activities. Various county departments, particularly the Refuse Disposal Division of the Department of Public Works, city agencies, and a private group called the War Against Litter Campaign, have enlisted the support of thousands of residents in a continuing countywide campaign. To encourage the program, the county allows the Director of Public Works to waive disposal fee payment for two important instances:

1) When the garbage or refuse collected is part of an anti-litter, clean-up, or like campaign for civic beautification by youth or civic groups, such as the Boy or Girl Scouts; or
2) When the refuse is generated in the course of collection and salvage of materials donated to nonprofit charitable organizations, such as the Salvation Army and Goodwill Industries.

An important event for publicity and public education is a "go-see" trip for citizens and public officials. Groups should be taken to see a well-run incinerator, sanitary landfill in operation, and completed and converted fills.

A major source of opposition may be due to the disposal method "credibility gap." Most people have never seen a good disposal operation because good ones are inconspicuous. What they remember are sooty incinerators, rat-ridden dumps, and all the other bad aspects of improper disposal. The voters frequently will not believe that a sanitary landfill is different. Few people understand the difference between a sanitary landfill and a dump. People will argue that a dump in the neighborhood will depreciate land values. It is important to stress what the fill will be when completed—a baseball field, golf course, botanical garden.

In many areas, local groups will help finance the purchase of litter baskets to be placed around the area. Such activities give them a feeling of involvement and responsibility for solid wastes control.

Homeowner Information. Providing information sheets concerning solid wastes programs and services to the homeowner is also an effective tool in building a desired image. Using pictures, cartoons, and a lighthearted touch makes a better impression than hard-to-read mimeographed orders, which will probably wind up in the waste can. The appearance of the brochure, of course, is secondary to providing top-quality information and service.

Every residence in the community should be supplied with a set of instructions about the schedule for collection, preparation of garbage, trash, yard clippings, and bulky items; and a phone number to call for more information or to register a complaint. When Tucson, Arizona, changed its collection system, the Refuse Division of the Department of Public Works issued a booklet using comic figures to seek homeowner cooperation and to show common failings (see Figure A). To inform homeowners of a change in collection or disposal practice, Philadelphia collectors deliver notices door to door along the collection route (see Figure B). To reach non-English speaking residents, Philadelphia has distributed brochures, litterbags, and signs in Spanish. Notices can also be distributed along with other government mailings such as school notices and utility bills.

Communications Media. Although most effective, personal contact can reach only a few people at a time. Therefore, other public relations tools which reach broader segments of the population should be used simultaneously. Films on good solid wastes management can be broadcast locally to be viewed by civic groups meeting at several locations as well as the general public. The film should be well publicized in the local newspapers and in civic group newsletters. Group discussions can follow the film. Questions can be phoned to a local government office which would stay open to answer them.

Some forms of public relations, particularly radio and television messages, are used most successfully to reinforce existing attitudes and to motivate people to act on their beliefs. In Baltimore, Maryland, public officials capitalized on the goodwill generated after a successful clean streets campaign. The city used one-minute radio announcements to tell residents what was necessary to continue to keep streets and alleys clean, how the municipal collection and disposal system operated, and the telephone number available to register a complaint or obtain more information.

be blunt but positive

Since it is easier to attack a program than sell one, the "anti's" often get more news media attention. To counteract this, the "pro" group can attack the existing situation in blunt terms while at the same time conducting a positive program for change.

People are already aware of what they do not like about garbage and everything associated with it, so they are likely to react emotionally to anything they believe will make it worse. The official should use to advantage those subjects which people are already against, such as rats, blight, air and water pollution, flies, and depreciation of land values.

People relate to things they believe are good. The public official must show that the new system will be better than the

FIGURE B: HOMEOWNER INFORMATION
PHILADELPHIA, PENNSYLVANIA

NOTICE

RUBBISH and ASHES will not be collected
CHRISTMAS DAY
FRIDAY, DECEMBER 25

However your trash will be collected the following day
SATURDAY, DECEMBER 26

(THIS SPECIAL COLLECTION WILL BE MADE TO HANDLE THE EXCESS AMOUNT OF RUBBISH ACCUMULATED BECAUSE OF THE HOLIDAY)

SANITATION DIVISION
DEPARTMENT OF STREETS
Room 924, City Hall Annex

overcoming opposition to a sanitary landfill site

Hamilton, Ohio

"The best solid wastes public relations is good operation of sanitary landfills in the past," said the Hamilton, Ohio, director of public works. He also believes that residents who live near proposed landfill sites are always going to complain, so he warns other public officials to be prepared for such opposition.

Acting on these principles, Hamilton's public works director and other officials were able to overcome intense opposition from residents when the city proposed opening a new landfill near the center of the city. The controversial site was an abandoned gravel pit located on a 10-acre tract which separates residential dwellings and a few commercial buildings from railroad tracks. Landfill operations were to be conducted adjacent to the tracks and within 100 feet of the residences.

As soon as the site was announced, nearby residents unleashed a storm of protest. They organized and vocally opposed the new site at city council meetings and public hearings for months. They pleaded with the governor, state health officials, and even federal health agencies for support. Though the residents received no help from these officials, they continued their campaign. Local newspapers, according to the public works director, were scrupulously fair in explaining both sides of the issue.

City officials launched an informal campaign of their own to convince the protesting residents that their fears were groundless. Their most effective tool was in arranging visits for the public to the completed landfill site. (That site is now part of the Hamilton branch campus of Miami University.) Though some visitors were frankly amazed at the sanitary conditions and lack of nuisances, they still feared that the new site would not be operated with similar care. Many recalled an old burning dump which had existed near the first site prior to its use as a landfill.

Residents living near the new site also had visions of blowing litter. The public works director promised it would be controlled. In reply, the residents promised to complain loudly every time a stray piece of paper landed in their backyards. So the public works director installed an 8-foot wire fence around the site at a cost of about $3,000. As further insurance, he added snow fencing within the site itself to catch papers.

The city council had unanimously approved the gravel pit site by this time. To quiet citizen opposition, it publicly directed that the new landfill be operated according to the same high standards as the old one.

The gravel pit area had been a problem for fire and health authorities for years because it was overgrown with brush and had been subject to indiscriminate dumping. A professional exterminator was hired to bait the site to prevent rat migration to surrounding residential areas and the clean-up of brush and refuse burial began. After this initial job, some of the original protestors complimented the public works department on the site's "amazing improvement."

The fencing controlled access and litter problems. To lessen dust, a paved, all-weather roadway was constructed the complete length of the pit. A full-time attendant directs unloading and collects scattered refuse. Burning, scavenging, and salvaging are prohibited.

Continuing engineering supervision is also provided. The new site is inspected regularly by the local health department. In addition, the federal Bureau of Solid Waste Management in nearby Cincinnati uses the site for instruction purposes. This regular outside evaluation is helpful in gaining and maintaining public acceptance.

The site is in full operation now, with an expected life of two to three years. The working face is extremely small; litter is practically non-existent. It will probably be easier to convince residents that future sites can be long-range assets to the community by reclaiming land. However, warns Hamilton's public works director, "It is impossible to gain public acceptance when the public is personally acquainted with the nuisances and health hazards resulting from a dump or a substandard or poorly operated landfill." In short, for sanitary landfill operations, public acceptance depends on performance.

current system to win support for change. For example, he can use people's desire for clean water to stop riverside dumping.

Symbols and slogans can also be used to help people identify with a program. Smokey the Bear was the identity used to make the point that careful disposal of used matches and drenching campfires are contributions a citizen can make to help prevent forest fires. Keep America Beautiful, Inc., reminds people that "Every Litter Bit Hurts" because it requires dollars to keep highways clean.

These campaigns have been successful because the message is short, simple, direct, and clear. The message states the problem in familiar terms, and the required remedy. The message is delivered by some figure easily identified as good.

sources of opposition

A record of accomplishment and the enlistment of many sectors of the community in solid wastes management will help local government maintain widespread support when improvements touch politically sensitive issues such as site selection and raising funds through service charges, bond issues, or increased taxes.

Before controversy develops, the official and the citizens committee should study the attitude and motivation of those in the community who are likely to oppose their project. Sources of opposition include the following types of citizen.

- *People who don't want sites near them.* They are motivated by the belief that living near a disposal facility threatens the value of their property and lowers their status.
- *People who don't want to spend money.* They support a bad system at the added expense of inconvenience, lessened public confidence, poor land use, and endangered public health.
- *People who believe no solution is possible.* They lack information and thus need to be informed of current technology.
- *People who resist any change.* They may be favorably influenced if the explanation of what is planned is presented as an essential community improvement.
- *People who are apathetic or unenlisted.* They can be interested and motivated into personal involvement.
- *People who have inadequate or erroneous information.* They can be influenced by complete information and thoroughly documented facts.
- *People who are politically opposed to those advocating the program.*
- *People who do not think the agency can do a good job because of past practice.*

Accumulations of rubbish like this one on a downtown street strengthen the distaste many people feel for the whole subject of wastes control. One counteraction is to clean up the mess and use that as a starting point to gain support.

Government laxity and bad previous experience stimulate the most forceful and persistent opposition. What a jurisdiction has done or permitted to be done has more influence than what it *says* it will do. It is especially difficult to counter arguments if a local government has tried to hide its failure. A credibility gap develops and citizens will not support any proposed system. No disposal site or system lasts forever, so it is better to do a good job from the start to avoid organized opposition when new sites and new programs must be established.

Opposition to a disposal method may spring from rumors that noxious gases exude from landfills, or that no incinerator can be operated in conformance with air pollution control standards.

Countering these arguments with facts open to inspection makes it much more difficult for opponents to play on emotions with half-truths. Public officials should make it clear they are striving to create the best system possible by applying the most modern technology, which is designed to conserve and protect air, water, and land from pollution.

To eliminate doubt, the campaign must make clear why the solid wastes system is absolutely necessary and why it is a bargain at the price. Delay will necessitate additional costs such as cleaning up the areas where wastes have accumulated. The cost of purchasing property and building facilities also rises each year. Sooner or later comprehensive solid wastes management must be undertaken; the sooner, the more reasonable the cost.

Securing a Site. No matter which disposal method is selected, a site is required. And unless the local government has already established a good reputation for proper wastes management, there will be a vociferous site fight. The results of thorough technical evaluation should be the primary consideration in site selection, but political feasibility is also essential. Until a firm decision is made, the location under consideration should be kept confidential. Premature disclosure of possible site locations can spell disaster. One county commissioner wisely advises, "Once the site has been designated, stick to it. If you shift a quarter of a mile, you will shift sites forever."

Various groups, including conservationists, land developers, and sportsmen, will be interested in site location and its effect on the surrounding land. For example, when a sanitary landfill site would destroy wetlands or marshlands which constitute a wildlife habitat, a vigorous outcry can be expected. Conversely, working with conservation groups to dispose of solid wastes in a manner consistent with good conservation can provide a source of citizen support.

The public hearing or town meeting can be an effective vehicle to win support. Here the representatives of local government must publicly face the opposition and answer objections. In this situation, public officials must show leadership. If a meeting ends without victory, the battle is not lost. Several confrontations may be needed, but at each meeting an impression is made. Convincing a few people each time may bring success.

One effective technique is to establish an Office of Land Acquisition with responsibility to purchase land for all public facilities, such as fire stations, police stations, schools, and parks. Advance acquisition of land, which is possible under this system, permits early acquisition of undeveloped land, which can be immediately identified as landfill or incinerator sites before nearby development preempts such land uses. Subsequent zoning cases will be held in light of this knowledge and no one will be able to claim that a landfill or incinerator was rammed into his neighborhood without notice.

Generally, a land acquisition office could purchase suitable land as it becomes available, in advance of scheduling in the capital improvement program. If a county is forced to wait several years because of fund limitations, very often the most desirable site will have been acquired for other uses and/or costs will have become prohibitive. In Baltimore County, Maryland, such an office was recently established and empowered to borrow up to

FIGURE C
IDEAS FOR PUBLICITY

TOPICS FOR WRITTEN PUBLICITY

Establishment of citizens groups
Statements by public officials
List of uncontrolled dumps, sources, and their pollution effects
Comparisons with similar communities which have set up good systems
Meeting announcements
Hearings on establishment of a system and site location
Setting up an agency; its organization, powers, personnel, budget, program
Agency activities—changes effected, inspections, court appearances, successes, failures
Visits from out-of-town experts
Findings and recommendations in the study and investigation report
State and federal grants received
Periodic progress reports
Go-see trips

TOPICS FOR VISUAL PUBLICITY

Rats in a rubbish pile
Open burning at dumps, demolition sites, individual homes
Demolition activities
Garbage collection in action
Scenes of litter, dumps and abandoned automobiles in alleys, along highways, in streams, and in wooded areas
Maps showing dump locations
Abandoned automobile removal
Operation of collection equipment
Activities such as picketing, meetings, inspection trips by officials
Smoke plumes from apartment building incinerators
Comparison shots of good and bad storage conditions, disposal sites, and incinerators
Model of landfill site with planned future use
Compost plant or sanitary landfill in operation
Flies on garbage
Go-see trips

stimulating involvement through humor

Kennebunkport, Maine

A newcomer to the town of Kennebunkport would have assumed a Martian invasion. But it was more like a dump explosion. All streets were barricaded against traffic. Most of the citizens were milling excitedly at the main intersection of town. An evangelist approached lamenting, "Repent. Use Your Dump." Another bedraggled follower carried a sign reading "God Bless Our Dump."

According to the president of the Kennebunkport Dump Association:

> *Each year, we sponsor a "Miss Dumpy" contest and a giant trash parade as the climax of the National Dump Week celebration. Another feature attraction is a dump-art exhibit in which all items are made of genuine junk. Throughout the year we issue dump users "Trash Stamps," bumper stickers, and automobile tags—all of absolutely no value. The "Dump Credit Card" entitles the holder to visit any dump in the country and is now a national anti-litter instrument.*
>
> *Most of us like to go regularly to the dump to engage in the lost art of dump-viewing, even though the town utilizes private rubbish collection. By personally delivering expensive boxes and wrappings at an optimum time, that is, when the dump traffic is greatest, neighbors can subtly be made aware of your affluence without undue boastfulness on your part.*
>
> *Our dump, cluttered to maintain a homey appearance, utilizes a combination of burning and covering. It is designed to allow for infinite expansion, in the shape of a pentagon. Although we have no official connection with the town dump, now "America's Number One," we use this association to emphasize that disposal of trash is vital to our society.*
>
> *Our association is primarily an anti-litter group, and is a nonprofit corporation under the laws of the State of Maine for the purpose of promoting interest in dumps. Our hope should be that a society that lives by its obsolescence may not perish of its own junk.*

At the outskirts of Kennebunkport, Burma-Shave-type signs declare: NEVER, NEVER, LITTER THE ROAD: BRING OUR DUMP ANOTHER LOAD. *Beneath all this tongue-in-cheek promotion, Kennebunkport and the State of Maine, which depends heavily on the tourist trade, are making serious efforts to attract and interest people in the problems of disposing of local and tourist trash.*

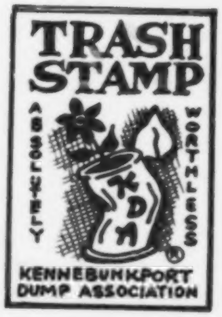
This case study is presented not to imply that dumps are good or a proper disposal method, but rather to emphasize that it is possible to stimulate community interest and enthusiasm in solid wastes control.

$1 million to provide funds for the advance acquisition of land for government purposes.

Securing Financing. Acceptable solid wastes management is absolutely necessary and improvements must be financed. The general tendency of the public when asked to approve government expenditures, is "when in doubt, vote no." When the law requires the public to vote on capital expenditures, a well-coordinated, public-support campaign is absolutely necessary.

St. Louis County, Missouri, has had several bond referenda related to solid wastes management expenditures. In 1963 a $104,035,000 bond issue for 12 separate projects was put to referendum and defeated. Plans were begun to resubmit the three most pressing projects. A long campaign of public education was then completed and in May, 1965, three bond issues for $41,500,000 were passed with the active support of a citizens committee.

When collection or service fees must be raised, it is important to provide careful explanation. In Fresno, California, the city went from once-a-week collection to twice-a-week and doubled the fee to the homeowner. Its successful information campaign based on public health arguments used a combination of citizens committees, films, TV programs, and a brochure explaining the need.



using the communications media

Newspapers, radio, and television publicity are effective means of stimulating public interest. Officials, the citizens committee, organizations supporting the program, and the local government public information officer should send news releases as often as justified. The more publicity is coordinated the better it is (see Figure C). Weekly and daily newspapers, commercial and educational television and radio stations, and community association newsletters should be used.

In requesting newspaper or media coverage of a particular event, officials should remember that many other community projects are competing for attention and be prepared to justify why their information is important and how the project affects the majority of the audience or readers. Personal contact should be made with the local government beat reporter or city editor.

Two types of media contacts are most useful. The executive or top editorial staff person can plant editorial ideas which a reporter cannot. In particular, this type of contact can provide support in the form of editorial page commentary and "crusade" material. On the other hand, the well-informed reporter can orient stories properly. It is worthwhile trying to identify knowledgeable reporters (TV or newspaper) who will appreciate the substance of solid wastes management stories.

"It is always possible to talk to the news media, confidentially if necessary, to ask media cooperation beforehand," recommended a Genesee County, Michigan, official. They should be told the advantages and disadvantages of the choices available, costs, and sources of opposition and support; then ask their support. The editor of a large metropolitan daily advises, "You can't hide a public business; the news media will uncover it. Instead, give us advance notice and easily digestible facts and information." Without this basic data, the media may end up providing incomplete information or overcoverage of the "anti" groups.

Some of the public relations tools available to reach people are publicity, advertising, printed materials, reports, publications, films, three-dimensional models, speakers bureaus, bumper stickers, meetings, workshops, billboards, radio and television announcements, and programs.

The use of these tools is designed to reach, inform, and convince as many groups as possible at a time, so it is useful to direct some materials to a general audience, and others to more specific audiences. Since not all of the groups reached will have identical opinions or hold them with the same intensity, it is important not to antagonize those people who are inclined to support the program while trying to win the support of those who are opposed.

public service announcements

Newspapers. Public officials should know what kind of material newspapers prefer, what their deadlines are, how much advance notice they prefer, and what kind of coverage they are equipped to provide.

The use of the standard format for press releases is essential. The copy must be typed (double-spaced) or mimeographed, with generous margins and at least four inches blank space at the top of the page. The page heading should be set up:

FOR IMMEDIATE RELEASE or, FOR RELEASE: TUESDAY, APRIL 1, 9 a.m.
TOPIC: Closing of City Dump
ISSUED BY: Citizens for Clean Air
FOR MORE INFO CALL: Mrs. Filter, IK 3-2000

The opening paragraphs should cover who, what, where, when, how, and why.

Pictures for publication should have something to say. A picture which dramatizes a problem or shows action is more interesting—and much more likely to be published—than one of citizens stiffly posed.

Radio and TV. Announcements and press releases sent to radio and television stations receive more attention if they include more information than those sent to newspapers.

For radio news releases the heading at the top of the page should be as follows:

GOOD FOR BROADCAST FROM: April 1 thru 10
TOPIC: "HELP CLOSE THE DUMP"
ISSUED BY: Citizens for Clean Air
FOR MORE INFORMATION CALL: Mrs. Filter, IK 3-2000
Number of Words in the Announcement *100*.
Suggested Reading Time *30* seconds.

For television news release and public service announcements use the above, plus suggested picture, for example: TO BE READ OVER SLIDES. The page should be set up in two columns. The left indicates what is seen; the right what is said; for example:

VIDEO	*AUDIO*
Slide 1 of Dump	*VOICE:* DISPOSAL OF YOUR TRASH IS A CRISIS IN DIRTY COUNTY.

For routine TV announcements (not fast-breaking news), the station probably has a general public service announcement slide. Officials should find out before having slides made, and check to see whether the station prefers color or black and white. Slides for television are the same as ordinary home 35mm slide film.

Public service announcements for both radio and TV should be supplied in triplicate. Generally, short announcements should be 10, 20, 30, or 52 seconds in length when read aloud clearly. Releases and slides for such spot announcements should be sent to the station a month ahead of time if possible. Some local solid wastes agencies may be able to prepare or have prepared TV spot announcements. A spot which costs $1,000 to produce might garner public service free time usage worth hundreds of thousands of dollars.

news events

Any time an event can be turned into news, production becomes the responsibility of the media, thus avoiding the technical problems inherent in preparing public service announcements.

When inviting newspaper, radio, or television to cover an event, a data sheet of facts and figures (not opinions) should accompany the invitation. Radio and newspapers are more able than television to cover fast-breaking news.

Many stations have locally produced programs concerning community affairs. These programs may be "talk" shows, human

appendix

sources of information on solid wastes and methods of citizen support

Office of Solid Waste Management Programs
Environmental Protection Agency
5600 Fishers Lane
Rockville, Maryland 20852

National Clean-Up, Paint-Up, Fix-Up Bureau
1500 Rhode Island Avenue, N.W.
Washington, D.C.

League of Women Voters of the United States
1200 17th Street, N.W.
Washington, D.C. 20036

National Association of Broadcasters
1771 N Street, N.W.
Washington, D.C. 20036

Public Relations Society of America, Inc.
845 Third Avenue
New York, New York 10022

films

(numbers in parentheses are order numbers)

The following films are available from the National Audiovisual Center (Annex), Station K, Atlanta, Georgia, 30324, unless followed by another address: *The 3rd Pollution* (AM-1404); *A Day at the Dump* (M-1600-X); *The Stuff We Throw Away* (M-2048-X); *Sanitary Landfill: One Part Earth to Four Parts Refuse* (M-1740-X); *Waste Away* (M-2047-X); *Collector's Item*, International Harvester Company, 401 North Michigan Avenue, Chicago, Illinois 60611; *A Decent Burial*, Advertising Division, Caterpillar Tractor Company, Peoria, Illinois 61602.

interest spots, news reports, or documentaries. Officials should talk with the program director about the interesting aspects and importance of solid wastes management which could be incorporated into one of these programs.

Most television programs are pre-recorded. Government officials or a citizens committee may know of a good film on solid wastes management, which a local station will agree to broadcast. The citizens committee can publicize the program and encourage group discussion. It may be also possible to follow the film with a discussion on TV.

Some appropriate films are *The Third Pollution*, *A Day at the Dump*, *A Decent Burial*, *Collector's Item*, and *Wealth of the Wasteland*. (See the appendix for addresses.)

The Third Pollution is a documentary of the status of methods of solid wastes disposal today. International Harvester Company sponsored a film called *Collector's Item* which discusses the Los Angeles County collection system. It is slightly dated, but the message still holds. Caterpillar Tractor Company offers a 12½-minute color film called *A Decent Burial* on the proper operation of a sanitary landfill. The problems of waste and pollution in an affluent society are the subject of *Wealth of the Wasteland*, a 26½-minute color film which is available free on short-term loan. The Institute of Scrap Iron and Steel has two films, *The Eternal Harvest* and *The Endless Search*, about the iron and steel industry's work in recycling solid wastes materials.

Solid wastes management is so important and citizen understanding so inadequate, that public officials should consider obtaining professional public relations assistance to help improve community identity and especially to help on campaigns for site approval, bond issue approval, and other controversial questions. The local government public information officer can provide continuing citizen and media information, but he will sometimes need outside specialized public relations assistance.

summary

A sound public information program is an essential aspect of solid wastes management. Public support is especially necessary to implement a new solid wastes management system or to modify substantially an existing system. The strategy of a citizen support campaign should be formulated early in the planning stages.

Local government should establish a record of accomplishment in solid wastes management. In the time it takes to complete a detailed comprehensive solid wastes management plan, local government can involve organizations and private industry in solid wastes management through community improvements such as illicit dump cleanup, litter control, improved solid wastes storage, and abandoned automobile removal.

Local government and the citizens committee should use as many public information tools as possible to inform citizens. Among them are meetings at which slides and films are shown; creation of events such as "go-see" trips; personal contact by telephone and door-to-door canvass, speakers bureau, brochures, and flyers; radio, television, newspaper, and newsletter coverage and announcements; and communications media endorsement.

Local government should make full use of a public information officer, if it has one; volunteers with experience in public relations; and possibly professional public relations services.

selected bibliography

Anderson, Desmond L. (ed.), *Meaningful Public Relations*, International City Managers' Association, 1140 Connecticut Avenue, N.W., Washington, D.C., 1966. Price: $9.50.

Getting Something Done: Political Effectiveness and Conference Techniques, League of Women Voters of the United States, 1200 17th Street, N.W., Washington, D.C., 1968. Price $.30.

Meaningful Meetings: The Role of the Resource Committee, Publication Number 319, League of Women Voters of the United States, 1200 17th Street, N.W., Washington, D.C., 1966 Price: $.40.

Scandlyn, Sammie Lynn (ed.), *101 Winning Ways to Better Municipal Public Relations*, National League of Cities, 1612 K Street, N.W., Washington, D.C., 1967. Price: $1.25.

Tips on Reaching the Public, Publication Number 277, League of Women Voters of the United States, 1200 17th Street, N.W., Washington, D.C., 1967. Price: $1.25.

9 personnel

personnel

introduction

The ability to attract and retain good employees in a local solid wastes management program is essential to its success. Many local governments have invested thousands of dollars in equipment, facilities, and sites but have not "invested" in adequate salaries, wages, training, and benefits to attract and retain competent personnel. Expensive collection and disposal equipment and plants are useless without competent, trained personnel. Sanitary landfills become dumps; incinerators cause air pollution. Citizens become outraged at sloppy collection.

The importance of hiring and training competent solid wastes personnel is illustrated by the comments of Charles Williams, deputy councilman of the City of Los Angeles:

> Probably few things are closer to the attention of our taxpayers than refuse collection. We are casually aware of the policeman and the fireman. The average citizen will briefly wax indignant over schools, planning, traffic, recreation facilities.... However, let his trash remain unemptied, or his street unswept, and he takes it as a personal affront. This is a distinct service between the citizen and the city. The taxpayer is paying for . . . sanitation service and, by gosh, he expects to get it.
>
> It hasn't been many years since being a dogcatcher or a sanitation employee was the same as being at the bottom of the ladder. Today, we recognize that sanitation is a *profession*. . . . Only now we know that it takes good technical knowledge to be able to keep down the costs of collection and disposal and to properly utilize men and equipment.
>
> "Top-Side View of Refuse Collection and Disposal," *Proceedings of the Fourth Annual Meeting of the Governmental Refuse Collection and Disposal Association, Inc.*, November 10-12, 1966, pp. 12-13.

The "garbage man" has traditionally been looked down upon by society. This prejudice has been reflected by local government personnel practices, which need to be changed.

Careful thought should be given to new methods for attracting and retaining employees. Solid wastes departments must not be allowed to become dumping grounds for unqualified men. The service is costly enough without increasing costs through inefficient performance.

personnel practice

Local elected governing board members are responsible for establishing and maintaining a personnel system. The effectiveness of that system will determine the performance and efficiency of the local government, including the agency regulating or providing solid wastes services. Although the daily operation of the personnel system is the responsibility of personnel specialists and the department(s) responsible for solid wastes management, elected officials should make it clear that they want to hire the best qualified workers on an impartial basis.

Public works, sanitation, and other agencies involved in solid wastes operations have often been staffed largely through patronage appointments because of the large number of unskilled jobs involved. Public officials are beginning to recognize that proper collection and disposal must be carefully planned and implemented for economic, aesthetic, and health reasons; and that qualified and well trained personnel will help that implementation.

Many elected governing board members believe that merit systems have made life easier for them. One former county board chairman said that before adoption of a merit system, friends would come to him for jobs, and he either had to find jobs or lose votes. Today he just takes them to the personnel office to be tested. Those who fail usually leave and he doesn't see them again; those who pass get the job they are qualified for.

Unfortunately, many local governments have not established modern personnel systems. One reason for failure is that, until recently, relatively few people were employed by localities so the need for formal procedures was not evident. As the responsibilities of local government expand, there is a corresponding need for employees with higher qualifications and for a personnel management system. This does not mean that a small organization

Uniform, covered, handled trash receptacles, of the type shown here, make it easier on collection crews, more sightly for the neighborhood, and more healthful to all. These 30 gallon containers are standard in many areas.

BASIC STANDARDS OF PERSONNEL ADMINISTRATION

Good personnel administration requires the application of basic standards that will result in:

1. Attracting qualified persons to the refuse disposal service through a reputation for fair dealings, career opportunities, able management, and as favorable working conditions as are possible.
2. Providing remuneration that is equal at least to pay for similar work in private industry, taking into account the fact that work must sometimes be performed under unfavorable physical conditions.
3. Encouraging long service on a career basis through dependable stable employment with opportunities for advancement and eventual retirement.
4. Guaranteeing equal opportunities for all qualified persons to compete for entrance and promotion under impartial and high standard examination procedures.
5. Training employees to do their work better and easier as a means to advancement.
6. Protecting employees from arbitrary separation from the service for trivial or personal reasons, but providing means of discharging incompetent and other undesirable employees for cause.

(These principles apply equally to collection as well as disposal.)

Source: American Public Works Association, *Municipal Refuse Disposal* (Chicago: APWA, 1966), pp. 342-343.

must establish an elaborate personnel system. However, written policy statements and the assignment of personnel matters to one individual will be of great assistance to the person in charge of solid wastes management.

A centralized civil service or personnel department will not solve all solid wastes personnel problems, but it should help greatly. The personnel department can assist the solid wastes agency by helping to develop position classifications, by recruiting, testing, screening, and selecting applicants, and by assisting the operating department in developing and administering orientation and training programs.

Whether or not a central personnel agency exists, the department head responsible for solid wastes management (especially in agencies where a large number of men are needed) may want a departmental personnel officer. The departmental personnel officer can relieve the department head of such time-consuming personnel duties as training, orientation, and liaison with the central

providing personnel for a growing solid wastes system

DeKalb County, Georgia

DeKalb County, Georgia, encompassing portions of Atlanta, has 360,000 residents. The DeKalb County Sanitation Department was established in 1937, employing one driver and three waste collectors to serve 500 customers. Today a staff of over 500 services 80,000 private residents, 10,000 commercial establishments, and 4,000 apartment complexes. Solid wastes are disposed of at either the county's incinerator or one of two sanitary landfills. The sanitation department is functionally divided into supervison for collection and landfill operation, and for incineration to ensure effective control over both areas of operation.

To collect the residential food waste and refuse each day (and operate the landfill sites) requires 320 laborers, 125 drivers, 15 field supervisors, and four area supervisors, along with secretarial and administrative staff. Collection is carried out separately—picking up garbage twice weekly and rubbish once a week. To dispose of this waste requires 39 additional employees operating on four rotating shifts seven days a week, 24 hours a day. The incinerator processes approximately 600 tons of wastes per day.

A major reason for DeKalb County's highly successful solid wastes management system has been its growing awareness and emphasis on staffing procedures. This is best expressed in a comment by the superintendent of sanitation: "We're trying to build pride in labor throughout the system."

To spur this pride among employees, the sanitation department provides and maintains uniforms with identifying county labels. In addition, protective clothing and equipment is provided for those employees working under hazardous conditions. Locker room facilities and assembly rooms are provided for the collection crews.

Like other county departments, the sanitation department operates under a merit system, with the exception that laborers may choose not to participate in the merit system. To help ensure higher efficiency and continuous employment by those laborers who choose not to work under the merit system, an incentive plan has been set up with bonuses for those who maintain complete, weekly working schedules.

All employees receive competitive wages. Laborers working under the merit system also receive fringe benefits, such as insurance programs, vacation and sick leave.

Recruitment and promotion are on a competitive basis for all employees, with physical and mental examinations used to qualify applicants. On-the-job training is conducted for all employees, and regular safety practices are enforced to reduce accidents. Also, the county health department provides inoculation for diseases that might be contracted by workers.

The department is aware that adequate solid wastes management depends on the regular and high performance of collection and disposal crews.

personnel office. In small agencies, an individual may handle personnel duties in addition to other tasks.

recruitment

Where a comprehensive solid wastes management system is operated by the local government, people with a variety of skills are needed. The central civil service or personnel department usually recruits and screens while the solid wastes agency hires. In a small county, responsibility for solid wastes management may be assigned to an individual who will recruit and hire the personnel needed.

Professional personnel such as administrators and engineers can be recruited through universities, professional journals, and professional associations. One private collection company recruits its supervisors from among junior college graduates. This firm also recruits business management graduates and starts them as supervisors and surveyors.

Since solid wastes programs require large numbers of truck drivers, equipment operators, and laborers, recruitment for these positions demands the major effort. According to the American Public Works Association, wages and salaries account for 60 to 80 per cent of the total cost of solid wastes collection.

Qualifications and Testing. In recruiting personnel, administrators should be sure that qualifications are realistic. One example of poor practice occurred in a northwestern city where passage of written civil service examinations was required for collectors. Many of the applicants could not pass the written tests although they were well qualified to perform the physical tasks required. In this case, rigid, unnecessary testing defeated the purpose of examinations. There is a rational middle ground between the extreme of hiring without testing and complicated testing and control procedures that do not consider realistic, practical work requirements.

In some areas of short labor supply, it is difficult to recruit men who can read and write. Since solid wastes employees are usually required to turn in reports, localities might pay men for attending basic education classes. Such self-improvement incentives might encourage more young men to be interested in solid wastes agencies.

An inexpensive and simple method for recruiting and employing laborers has been suggested by the International City Managers' Association. Newspapers, radio, television, and personal contact are used to attract prospective personnel. Applicants for manual jobs come to the personnel office or solid wastes agency to register. As workmen are needed, individuals are called in to fill out formal applications showing their experience, training, and other information. At this time, the applicants are questioned about their health, strength, and physical fitness and rated as to qualifications. Lists of those qualified are prepared and hiring done in order of rating as to qualifications.

A more accurate rating of ability and attitude can be made based on actual performance during a probation period. A physical examination should be given before hiring. This will help to avoid unnecessary injury to workers and decrease the agency's expense for medical care, workman's compensation, and sick pay. Many solid wastes departments check with insurance companies to be sure an individual has not made any claims for back injuries.

JOB DESCRIPTION

COUNTY OF
ORANGE, CALIFORNIA

REFUSE DISPOSAL
ENGINEER
[DIRECTOR OF PROGRAM]

(Established March, 1964)

DEFINITION

Under general direction, to plan and direct the county refuse disposal system of disposal sites and transfer stations; and to do other work as required.

EXAMPLES OF DUTIES

1. Makes immediate and long-range plans for efficient and economical operation of the county's refuse disposal system of disposal sites and transfer stations; studies prospective sites and arranges for acquisitions of properties by lease or purchase.

2. Conducts studies and prepares plans showing proposed site development and operational conformance with plans.

3. Coordinates the use and location of operating personnel and heavy equipment to obtain operational efficiency at disposal sites and transfer stations.

4. Appears before municipal councils and planning commissions to acquire use franchises for disposal facilities.

5. Advises public and handles complaints regarding refuse collection procedures.

They also check with police for any criminal record. (However, no man should be refused a job until he has had an opportunity to explain violations.)

Truck drivers can be recruited by the same procedures, supplemented by a driver's qualification and rating test. Advancement to driver classification should be available to qualified laborers. Successful completion of a driver training school course should be recognized. Good driving records should be required of all drivers.

Rather than build expensive, permanent facilities at disposal sites with a short life-span, some sanitation departments use trailers to provide the necessities.

Recruitment of qualified heavy equipment operators and other specialized technicians is also important. Most agencies require that applicants have experience. If recruitment of experienced men is impossible, training programs can be established to teach those applicants who seem to have an aptitude for, and an interest in, this type of work. Some solid wastes agencies have found that applicants who have operated farm equipment are good at handling heavy equipment and generally have some knowledge about minor maintenance procedures.

Foremen and supervisors can be recruited from among employees. Hiring from within provides incentive, but when no existing employees can meet job qualifications, the agency should begin outside recruiting.

In the long run, careful recruitment will save the solid wastes agency time and money. Through systematic recruiting and careful screening of applicants, competent men can be hired, and employee turnover can be decreased.

The final selection of employees should be left to their direct supervisors insofar as possible. This is important to a successful personnel system since day-to-day management is the responsibility of supervisors. If there is a central personnel office, it should formulate overall recruitment policies in consultation with

6. Reviews applications for franchises and makes appropriate recommendations concerning them to the Board of Supervisors of Orange County.

7. Corresponds with citizens regarding illegal dumping.

8. Prepares technical reports for departmental use and Board of Supervisors' review regarding operation methods, distribution of equipment and personnel.

MINIMUM QUALIFICATIONS

1. Possession of a valid Certificate of Registration as a Civil Engineer issued by the California State Board of Registration for Civil and Professional Engineers.

2. Possession of a valid California Driver's License.

Education

Graduation from a recognized college with major work in Civil Engineering.

Experience

Three years of professional Civil Engineering experience of an increasingly responsible nature.

Knowledge of

Principles and practices of civil engineering.

Design principles and strength of materials.

Land acquisition procedures.

Methods and controls regulating refuse collection franchises and illegal dumping.

Ability to

Plan and direct a program of location, construction, and use of refuse disposal sites and transfer stations.

Review and personally prepare plans and specifications.

To direct the work or inspect and control work in progress on site construction.

Maintain cordial relationships with the public and representatives of local government in obtaining disposal facilities or use franchises for such facilities.

Prepare and control budget requirements.

Lay out work for others and direct them in their work.

Analyze situations accurately and take effective action.

Dictate correspondence and prepare comprehensive reports.

Physical Qualifications

Medical Group III—Light Duty.

operating departments, but the operating solid wastes agency supervisors should make the final decision on hiring.

Other Recruitment Techniques. In order to attract and hire skilled and unskilled labor, the personnel agency must be imaginative. Posting notices and then waiting for applicants is usually inadequate for solid wastes jobs because they involve rough, dirty work 52 weeks a year in all weather.

New recruiting methods, facilitating the joining of jobs with job-seekers, have been adopted in several areas. In the City of Baltimore, Maryland, a single centralized agency keeps a computer list of available jobs in both public and private agencies. Each day the computer prints a list of job openings which is sent to all agencies conducting job training or placement programs as well as other interested agencies.

In King County, Washington, sanitary landfill operations are conducted on a mountainous site which is scheduled to become a park. Screened from disposal operations by trees is the county's alcoholic treatment center. Alcoholics receiving treatment are asked to work at the site if they desire. The men police the area, check trucks, and perform other tasks as a supplement to the regular workmen. Frequently solid wastes agencies can cooperate in work-release programs.

Some television stations, following the lead of the "Opportunity Line" show on educational station WTTW in Chicago, conduct job information programs. WETA, in Washington, D.C., has a one-year grant from the Social Rehabilitation Service of the Department of Health, Education and Welfare for producing "Jobs 26." This program has two hosts who chat informally about various topics, emphasizing employment information. A U.S. Employment Service employee spends full time assembling information about training and job opportunities in the metropolitan area for the program. "Jobs 26" has had many more calls from job seekers (largely unskilled) than it has had from prospective employers.

The use of a weekly or monthly news sheet from the solid wastes agency to its own employees listing vacancies can also aid recruiting. The employees will not only know about advancement opportunities but can also pass on job information to friends and relatives.

compensation

The most aggressive recruiting program will be useless unless the solid wastes management agency offers adequate compensation and incentives to employees. Failure to recognize that "you get what you pay for" has made recruiting difficult for some solid wastes agencies. The low priority and status given solid wastes collection and disposal operations by many localities has been reflected in low wages and salaries and inadequate benefits.

Compensation includes salaries or wages, and a variety of fringe benefits which should be at least comparable to those given for similar work in private industry and other public agencies. Because of the poor image of solid wastes jobs, it may be necessary to offer higher wages and better fringe benefits than might be available for similar work.

Salary and Wage Plans. Local governments should periodically survey salaries and wages in their area to be sure that the solid wastes agency and other public agencies are keeping pace

JOB DESCRIPTION

COUNTY OF
ORANGE, CALIFORNIA

PUBLIC WORKS
FOREMAN III

(Established April, 1964)

DEFINITION

Under direction, to assist in the planning of the work of a major public works operation force; to coordinate, assign and supervise public works maintenance and construction operations for a large public works maintenance operation force; to plan, assign, and supervise the work of refuse disposal operation; and to do other work as required.

CLASS CHARACTERISTICS

Positions in this class coordinate and supervise the over-all maintenance and construction work, on a countywide basis, for a major public works maintenance division or coordinate and supervise the countywide landfill refuse disposal operations. Incumbents are responsible, through the use of scheduling and programming for the effective and efficient use of personnel and equipment. Supervision of maintenance, construction, and refuse disposal operations is normally through intermediate supervisors at the Public Works Foreman I and II levels.

EXAMPLES OF DUTIES

1. Assists in planning the administrative policies, programs and procedures for a maintenance operation force; assists in planning the work of the maintenance forces division and the allotment of personnel and equipment, prepares and submits cost and material estimates; prepares work orders and schedules and assigns equipment and crews to projects and supplies technical direction as required; directs the construction activities of major

with private companies. Salary and wage plans should provide regular increases for efficiency and longevity and reward those who have better skills. Good attendance and safety records may be the bases for incentive awards.

Fringe Benefits. Fringe benefits, including retirement plan, sick leave, paid vacation, group health and life insurance, workmen's compensation, uniforms, and safety equipment are an important part of compensation for private and public employees. Most of these benefits increase and improve with longevity and provide incentives to professional, skilled, and unskilled employees to remain in solid wastes agencies. Benefits are a large part of "real" wages, and solid wastes agencies should make it clear to employees how much these benefits are worth.

Failure to provide adequate disability payments and retirement benefits can be a serious problem in solid wastes agencies where physical fitness is required. If the solid wastes program is part of a sanitation or public works agency, older men from collection crews can be transferred to street sweeping and other less strenuous tasks. Early retirement plans have also been suggested as a method for making solid wastes collection work more attractive.

working conditions and safety

Hours of Work and Crew Organization. Collection and disposal crew organization and working hours vary according to local requirements and conditions. Since conditions vary so greatly,

projects by maintenance forces through subordinate foremen.

2. Plans, coordinates, assigns, and supervises the landfill refuse disposal operations and the operations of refuse disposal transfer station; confers with commercial refuse collection firms regarding county policies and procedures and complaints; inspects landfill disposal sites to insure that work is being done according to landfill plan; establishes basic operating schedules.

3. May direct the maintenance and repair of mechanical equipment.

4. Plans and directs the procurement, storage and issuance of equipment and supplies.

5. Directs the patrolling of flood control channels and inspection of construction activities adjacent to and affecting county flood control rights of way.

6. Directs the operation of pumping plants, dams, and retarding basins.

7. Makes recommendations concerning the repair or replacement of heavy equipment or the purchase of new equipment.

8. Inspects work progress and completed work.

9. Investigates complaints in connection with departmental activities.

10. Assists in interviewing and recommending hiring of personnel; plans and directs the training of employees.

11. Maintains records and prepares progress and other reports; assists in the preparation of the budget; acts for the Supervisor in his absence.

MINIMUM QUALIFICATIONS

License Required

Possession of a valid California Drivers' License.

Education

Graduation from high school or attainment of a satisfactory score in a G.E.D. test.

Experience

Four years of supervisory experience in public works construction or maintenance work.

Knowledge of

The methods, materials and equipment used in maintenance and construction of roads, bridges, and drainage structures or pipelines, flood control channels and dams.

The operation of a landfill refuse disposal station.

The operation and care of equipment and tools.

Principles of effective supervision and organization planning.

Ability to

Determine personnel, material and equipment needed to estimate the cost of specified projects.

Plan and direct the work of others.

Follow complex technical directions and to interpret plans and specifications.

Establish and maintain good public relations.

Physical Qualifications

Medical Group III—Light Duty.

routes must be planned and adjusted for each locality and neighborhood to insure good service. Supervisors should take into account daily and seasonal fluctuations in planning work schedules so that (1) adjustments can be made to insure that men can work a set number of hours; (2) overtime pay is kept to a minimum; and (3) collection and disposal operations run smoothly. Laborers should have job security and regular employment. Solid wastes agencies which provide permanent full-time jobs are less likely than others to have high turnover and more likely to have trained men available. For detailed information on crew organization, see the American Public Works Association's *Refuse Collection Practice*.

Appearance of Solid Wastes Personnel. Collection crews are on the streets every day, and are seen by many citizens. Most public and private employees who are seen daily such as policemen, firemen, meter readers, and mailmen wear clean, neat, easily recognizable uniforms. Unfortunately, this is not always true of solid wastes collectors.

Several sound reasons for having solid wastes employees wear uniforms follow.

1. Employee morale is improved—they look better, feel better, and work better.
2. Uniforms improve public respect for solid wastes operations.
3. Properly designed uniforms will protect the health and safety of employees—dirty clothes cause skin diseases. Cuffs can cause tripping and loose clothes can catch in moving equipment.
4. Employees (especially collectors) are easily identifiable—prowler calls were reduced from 200 to two to three per week in Hyattsville, Maryland, after collectors were uniformed.

Within the disposal area, whether it be at a landfill or in an incinerator as here in Miami County, Ohio, air conditioned, reinforced cabs are necessary from both a health and safety standpoint.

Since solid wastes personnel must work in all kinds of weather, agencies should also provide protective outer garments such as gloves, boots, rainhats, and raincoats. Ideally, these should be carried on the collection trucks. If this is not possible, they should be readily available at headquarters or various area shelters. Protective gear should also be supplied to disposal personnel and kept at the disposal site. The investment needed for such protective garments should be recovered in less sick leave cost.

Employee Facilities. Most collectors and many disposal employees work outdoors all day at manual jobs requiring physical exertion. It is local government's responsibility to provide them with clean and decent facilities for washing, eating, and changing clothes. Collection crews should have clean shelters with lunchroom, toilet, and washing facilities located throughout a large city or county so that they have a comfortable place to eat, especially in inclement weather. Well maintained locker rooms and showers should be provided where crews assemble and are dismissed.

Provision of similar facilities for crews at disposal sites may be difficult but should be done for any site. A minimum of portable sanitary toilets, safe drinking water, and a place for eating lunch and changing clothes is needed for short-term sanitary landfill installations. Trailers are used for these purposes in some areas, such as the sanitary landfill at Frostburg, Maryland. Permanent clean facilities should be provided at all incinerators and compost plants. At its incinerator, Montgomery County, Maryland, provides a clean lunchroom and locker and shower rooms for the eight men on each shift. Clean, attractive employee facilities will protect health and improve employee morale and the public image of solid wastes operations.

Employee Accidents. The collection of municipal solid wastes, as practiced today, has the highest injury rate of all occupations except logging. Collectors have an accident frequency rate nine times higher than industrial workers, according to the National Safety Council.

Collection and disposal personnel may contract respiratory diseases and eye troubles because of dust and fumes. Common skin injuries suffered by collectors, as reported in *Occupational Diseases of the Skin*, include abrasions, puncture wounds, lacerations, burns, frostbite, and insect and animal bites. Preventive measures include frequent changing of dirty clothes; prompt cleansing and treatment of skin wounds; providing and requiring the wearing of hard hats, safety shoes, gloves, and goggles by all collection employees, and requiring hard hats, safety shoes, and face masks for disposal employees.

In collection operations, hazards include:

1) mounting and dismounting collection vehicles and equipment;
2) lifting and emptying containers;
3) heat exhaustion, diseases such as arthritis, muscle and tendon pulls;
4) respiratory ailments; and
5) damage to or loss of limbs from packer and collection equipment.

Among the factors contributing to collection accidents are old, unsuitable, or poorly maintained equipment (e.g., men must lift containers very high to empty them into open or high trucks); failure to enforce ordinances regarding size, weight, and handles of containers; haste of crewmen to complete route; improper lifting and carrying of containers; narrow streets; and vehicles backing into men.

At disposal sites, hazards to personnel include:

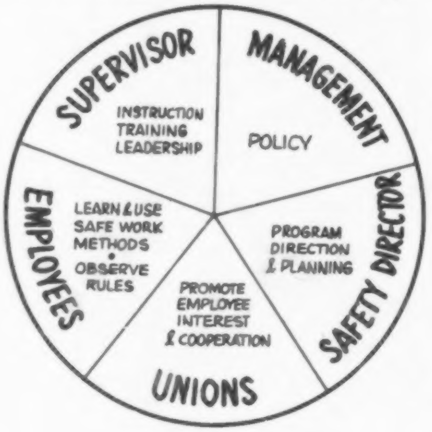
1) direct injury from explosion or fire;
2) inhalation of contaminants and dust;
3) asphyxia from smoke;
4) falls from vehicles into equipment or furnaces;
5) accidents from earth-moving equipment operation;
6) accidents from attempting to repair equipment while engine is operating.

Incinerator enclosures as well as compost plants should be heated in winter to protect men from drastic temperature changes. Sanitary landfill employees are subject to exposure, frostbite, heat prostration, dust, and odors. Enclosed, airconditioned cabs on heavy equipment are a good investment for both health and safety reasons.

Accidents are expensive; the indirect costs include:

1) lost time of injured employee;
2) lost time of other employees assisting the injured;

RESPONSIBILITY for SAFETY



Source: U.S. Dept. of Labor

3) lost time of supervisors helping employee, determining the cause of the accident, and arranging for a replacement;
4) damage to equipment;
5) interference with schedules and production; and
6) increased compensation, insurance rates, and settlements.

Safety Programs. Elected city and county officials should require that solid wastes agencies conduct an aggressive, regular, safety training program for all supervisors and employees. An accident prevention program should be preplanned and well organized and should show the personal support of elected officials. The program may be run on a city or countywide basis through a committee of department heads. It should cover such things as driver training, equipment handling, first aid, and general safety.

Special programs for solid wastes collection employees should include careful instruction in lifting and carrying, precautions in working around collection vehicles, and fire fighting. For example, collection vehicle drivers must be warned that back-ups cause 80 per cent of vehicle accidents. At least one person on every route should have completed a first aid course.

Most accidents are caused by people, not things. Human errors are caused by poor physical condition, insufficient rest, daydreaming, negligence, risk-taking, and poorly designed equipment. In developing and implementing a safety program, officials should realize that most people already know what they should do to minimize accidents. An adequate safety program constantly reminds the employee how accidents happen and how to avoid them. The safety program should stimulate an employee's *hazard awareness.*

a continuous safety program

National Disposal Contractors, Inc.
Barrington, Illinois

National Disposal Contractors, Inc. (NDC), has a continuous safety program based on standards set by the National Safety Council. The responsibilities for this corporation's safety program are shared among top management, the executive safety committee, the safety director, division executives, operating management, and employees. The program's purposes are to eliminate human suffering resulting from accidents; develop lower insurance costs; reduce indirect costs of accidents; and increase profits.

The executive safety committee is comprised of three top management representatives and the safety director. The committee advises the safety director, reviews progress of the safety program, determines objectives, formulates and approves general safety policies.

The safety director devotes full time to accident prevention for all 11 divisions and assists division managers with job training programs concerning vehicle and personnel safety. The director also collects and analyzes accident information; reviews, organizes, and takes part in each division's bi-annual safety meeting; plans and inspects new company facilities with division managers to detect any deficiencies that could lead to unsafe conditions and practices; recommends to local divisions the selection and purchases of safety equipment and supplies. The director also conducts a continuing safety education program on accident prevention for both management and employees, and attends seminars on safety and training to keep aware of new developments.

The top management of NDC considers line supervisors to be the key men in the accident prevention program because they influence and control the behavior of employees. Providing all new employees with thorough job orientation and training in accident prevention is probably the most essential area of responsibility.

Each employee is expected to contribute to the safety program by constantly following safe procedures on the job to protect himself, fellow workers, and company property.

Safety programs begin with careful screening of employees by giving initial job training and providing training manuals, and by keeping safety records for each employee. On-the-job training and developing hazard awareness must be a continuing process.

National Diaposal Contractors, Inc., assigns its department heads and supervisors these safety responsibilities:

1) providing employees with thorough job instruction and training;
2) setting a good example;
3) talking to employees daily about safety;
4) enforcing all safety rules and policies;
5) maintaining good housekeeping;
6) promptly investigating, classifying, and recording all accidents;
7) insisting on participation in the safety program by all employees;
8) distributing safety literature; and
9) observing collection vehicles in normal operation.

Safety is the responsibility of both labor and management. Management should be able to reward or discipline employees depending on their safety records. One of the prime responsibilities of local government is to provide proper and well maintained equipment. Enforcement of regulations which affect safety is also necessary.

To know the effectiveness of a safety program, the keeping of accurate records is essential. Details on recordkeeping may be obtained from the National Safety Council.

labor-management relations

The "garbage man" was front-page news in 1968 when strikes by collectors' unions in Memphis, Tennessee; Baltimore, Maryland; and New York City halted all residential collection in those cities. These strikes brought to national attention the growing influence of public employee unions. Such unions—whether they are called associations or are affiliated with the private sector labor movement—have steadily increased their numbers during the past five years.

The influence of a union or employee association can be worthwhile or obstructive, depending on the attitudes of both organization leadership and local government officials. Refusing to recognize legitimate rights of public employees to organize has been a common failure of many public officials. Many public employees are demanding what they consider to be their legitimate "rights" in a free, democratic society: the right to organize; the right to bargain collectively; the right to enter into a binding agreement reached through meaningful, good-faith negotiations. They demand to be heard when they have grievances.

The recent strikes by sanitation workers have shown that state laws prohibiting strikes are not effective. Public employees are willing to engage in strikes (or to use various devices as substitutes for the direct strike) to gain bargaining rights—if necessary in violation of the law.

Thousands of agreements between various levels of government or government agencies and their employees, negotiated without strikes, furnish proof that sound labor-management relations can exist within a framework of unionism.

Local governments should provide for receiving, evaluating,

a proposed safety and merit program

Witchita Falls, Texas

During the past few years Wichita Falls, Texas, like many other cities across the nation, has experienced economic conditions that have reduced the available work force in its sanitation department. Increased competition from industry for labor has resulted in numerous resignations from the department and qualified replacements have been difficult to find.

Early in 1969, Wichita Falls proposed a Safety and Merit Program designed to reduce the rate of resignations and increase the efficiency of the employees through financial incentives. The program was not implemented by the end of 1968.

Those disposal equipment operators and refuse collectors who have successfully participated in the Safety and Merit Program for six months will be awarded efficiency compensation in the form of salary increases. Requirements for efficiency compensation are as follows:

I. Attendance

In order for an employee to be eligible for efficiency compensation he may not:

1) *use more than two days sick leave annually;*
2) *use more than two days emergency leave annually; and*
3) *use more than two days leave without permission annually.*

II. Safety

For an employee to be eligible for efficiency compensation, he must not:

1) *be responsible for any accident involving time lost during a six-month period (first-aid is not considered time lost if the employee returns to work); or*
2) *be responsible for any chargeable property damage during the six-month period (charge-*

and taking appropriate action on employee complaints and suggestions. Complaints should be handled through established grievance procedures. If no formal grievance and appeals procedures exist, frustrated employees may leave the agency when an airing of views might have led to a satisfactory solution of the problem. Both agency management and employees must understand and have confidence in the procedures.

In *Refuse Collection Practice*, the American Public Works Association explains:

> Written personnel policies are absolutely necessary to the success of any grievance procedure in a non-organized shop. For the employees, they set forth top management's position on important personnel matters. For members of management they provide a yardstick for deciding specific questions and grievances which occur during day-to-day operations, rather than each following his own ideas.

Soliciting and rewarding employees for helpful suggestions is another technique which improves morale. In large organizations, such as the New York Sanitation Department, cash awards or certificates are made for useful suggestions. Even in a small agency the supervisor should encourage his employees to make suggestions orally or in writing.

A schism has developed in expert thinking on blanket strike bans which apply to all public employees, without regard to the critical nature of the services performed. The basic issue is to prevent disputes from reaching the stage where economic warfare becomes inevitable, and to develop alternatives to the strike or methods for resolving disputes. It is imperative that fact-finding, mediation, arbitration, "cooling off" periods, and similar techniques be used with more frequency and greater skill. Local officials *able property damage is determined by the Accident Review Board).*

III. Efficiency Rating System

Efficiency rating will be used to determine employee efficiency and is based on the following elements:

1) *dependability (work with minimum supervision)—reporting for assignments; no salvaging on city time;*
2) *job knowledge (sufficient knowledge to operate collection and disposal equipment)—knows routes; maintains good relations;*
3) *attitude (accepts assignments cheerfully)—volunteers to help others; maintains department morale; has good personal appearance;*
4) *initiative—demonstrates some leadership;*
5) *citizenship—takes care of personal financial obligations; takes interest in civic affairs; and*
6) *equipment upkeep—maintains clean route and equipment; does not abuse equipment.*

The elements for efficiency rating are constructed to eliminate, to the greatest possible extent, subjective judgment by the person rating employees. Records are kept of each employee's work performance within the scope of his job requirements. Each employee is rated monthly on six different elements measuring his efficiency. The rating on each item is recorded in a numerical value from 0 to 10; at the end of each six-month period, the number of points earned is totaled. A total of 360 points is possible over a six-month period. Those employees receiving a total of 280 points or more will be awarded efficiency compensation and those receiving a total of less than 100 points will be terminated.

Before this type of rating system can be adopted, a community must be sure that all equipment is as safe as possible. An individual cannot be held responsible for accidents resulting from faulty or poorly maintained equipment.

should recognize that problems exist and take steps to furnish the type of leadership needed.

training programs

local

Local solid wastes training programs are primarily job-oriented to help individuals do their tasks safely and efficiently. But all employees should receive a thorough explanation about employee rights and benefits and responsibilities before beginning work. This will assist both supervisors and employees to understand exactly what they are entitled to and what is expected of them. From professionals to laborers, proper orientation and training will help them do a better job. The time needed to teach good driving habits, proper lifting methods, and machinery operation, and to explain sick leave and vacation policy will be well spent. Agency management also has the responsibility for keeping employees informed about changes in personnel policies.

Collection and disposal crews should receive training from their immediate supervisors. Collection personnel must be given safety training in such areas as lifting and carrying, and also should be taught how to deal with homeowners. Authorities agree that training of operators is crucial to the success of a disposal program whether the method is sanitary landfill, incineration, or composting. In landfills the operators should understand why compaction and covering are needed. Training by solid wastes agencies will also help prepare men for promotion.

No local department or government can conduct all necessary training programs. State, federal, and private training programs should be utilized. Employees at all levels should be encouraged to attend solid wastes management meetings and courses. If at all possible, they should be permitted to attend during working hours, and be reimbursed for transportation, lodging, and meals.

state

Most state solid wastes programs are in the development stage; so formal training offered by states is limited. However, many state health departments are able to advise local governments in setting up training.

Since 1961, in the State of New Jersey, the Solid Waste Program of the Division of Clean Air and Water has been offering an 11-week course open to public officials, private contractors, supervisors, and interested citizens from any state. The course includes lectures, discussions, visual aids, and field trips covering all aspects of solid wastes. The cost of $60, and trainees attend class two hours per week. In cooperation with municipal contractors and the Extension Service of Rutgers University, the state offers both a basic and an advanced solid wastes course in various locations throughout the state.

In Oregon, the Solid Waste Section of the state Board of Health conducts a one-day training course for sanitary landfill equipment operators. For convenience, the state plans to conduct the course in four different sections of the state to be able to concentrate on the specific problems of each area.

The New York State Department of Health, Office of Environmental Health Manpower, conducts brief discussions and demonstrations of sanitary landfill operations throughout the state to public officials and interested citizens.

federal

Courses in solid wastes for scientists, engineers, sanitarians, and other professional and administrative personnel are conducted by the Federal solid wastes management program. Training includes consideration and appraisal of the newest developments in solid wastes management. There is no tuition or registration fee, but course rosters are limited and trainees must provide their own housing, food, and transportation. (Local governments should pay these costs for their employees.)

Although most courses are given in Cincinnati, Ohio, many can be presented in the field on request. For example, "Environmental Solid Waste Orientation," a one-day basic orientation in solid wastes environmental problems designed for professional administrators and public officials, is taught in the field on request.

The other solid wastes courses offered in Cincinnati are:

"Elements of Solid Waste Management" (one week)
"Incineration—Principles of Design and Operation" (one week)
"Solid Waste Handling—Field Evaluation" (one week)
"Sanitary Landfill—Principles of Design and Operation" (one week)
"Composting Methods" (one week)
"Solid Waste Handling—Health and Safety" (four days)

For a bulletin of courses and application forms write to:

Division of Technical Operations
Office of Solid Waste Management Programs
U.S. Environmental Protection Agency
Cincinnati, Ohio 45213

This injury prevention scoreboard is part of the safety program developed by Los Angeles, Calif. On the scoreboard, the various disposal districts are scored on the fewest number of accidents.

INJURY PREVENTION SCOREBOARD
FIRST
SECOND
THIRD
FOURTH
FIFTH
LAST
NORTH CENTRAL
SOUTH CENTRAL
WEST VALLEY
WESTERN
EAST VALLEY
OUR DISTRICT
SECTION
FOREMAN
SPARKS

private

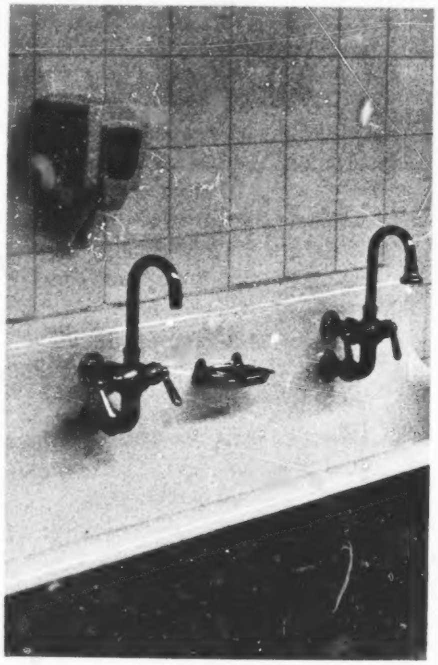
Several universities offer graduate courses in solid wastes management. The majority of programs are for engineers but a few will also accept non-engineering professionals. (See *Guide Number 7, Technical and Financial Assistance* for a list of universities.)

Various training courses in solid wastes management and technology are being prepared and offered by non-government and non-university groups. Further information may be obtained from the local chapters of American Public Works Association and/or the American Society of Mechanical Engineers or through the Bureau of Solid Waste Management.

The National Safety Council offers training and correspondence courses for individuals concerned with safety or interested in establishing a safety program. For information, contact:

Public Employee Section
National Safety Council
425 North Michigan Avenue
Chicago, Illinois 60611

Training should also be provided for solid wastes employees by all equipment designers and suppliers. Localities should make certain that equipment manufacturers give complete instruction in the use and maintenance of all equipment a solid wastes agency buys. Alexandria, Virginia, required the company with whom it contracted for incinerator furnace construction to put all operating instructions in writing and sign it. The manufacturer's representative spent one month giving on-site instruction, and the representative and contractor were on call for six additional months for training, advice, and troubleshooting. It is crucial that equipment designers and suppliers not only train personnel but actually observe employees operating the equipment.



Clean, pleasant, modern facilities boost morale and help inspire cleanliness among sanitation workers. These facilities, locker rooms, lunch rooms, showers, etc., are necessary from a health standpoint.

consultants

In many local jurisdictions, government personnel with the proper skills are not available, or the staff may be fully occupied with other important duties, so consultants are needed to assist local solid wastes agencies. The importance of using competent consulting engineers both in the preliminary study phases and in the design of facilities cannot be overemphasized. Too often, ready-made solutions have resulted in failure or unreasonably high costs.

Certain localities feel their needs justify the establishment of their own engineering design department. Even then, services of engineering specialists are used. For example, the Philadelphia, Pennsylvania, engineering staff designs incinerator and sanitary landfill facilities necessary to serve the city's two million people, but it also uses consulting engineers.

selection

An elected official should be careful to choose a qualified consultant. While the official himself will not make the study, he will be responsible for considering the solutions offered by the consultant and making final policy decisions. The decisions made will reflect on the official and will have a long-term impact on the community. Although each community's solid wastes problems are different, a great deal may be gained by retaining a consultant who has had experience working with many local governments and who is knowledgeable about the engineering of solid wastes management.

Five national professional engineering organizations have suggested that in most cases a temporary selection board for choosing a consultant be designated by elected officials. The board should consist of three persons, at least one of whom is an engineer, preferably the city or county engineer. Since the local engineer will have to work closely with the consultant, he should take part in the consultant's selection.

This selection board investigates and interviews various engineering firms. A parochial attitude toward hiring consultants should be avoided. The best local engineering firm may not be good enough or be experienced in solid wastes. The American Society of Civil Engineers offers useful guidelines in *Consulting Engineering, A Guide for the Engagement of Engineering Services.*

The selection board should check with officials of other local governments which have used the consultants and the state health department to determine the quality of the various firms' performances. Local officials should also visit facilities that the consultant has designed and constructed. These checks should not be limited to clients recommended by the firm. After a complete investigation of all candidates, three firms should be selected for further consideration.

STEPS IN CHOOSING A CONSULTANT

1. **Elected officials appoint temporary selection board.**
2. **Firms submit qualifications.**
3. **Board evaluates consultants' qualifications.**
4. **Board investigates consultants' past projects.**
5. **Board interviews prospects.**
6. **Consultants are ranked in order of preference.**
7. **Fees are negotiated.**
8. **Consultant is engaged.**

The firms' ratings shoud include location, reputation, experience, financial standing, size, personnel available, references, work load that would permit prompt and efficient service, and other factors peculiar to local needs. Of course, the firms' professional competence and experience should be the prime consideration, but officials must also consider the work load of the firms and their ability to make a report or design the project within the government's time limit. The selection board should talk with the specific individual who would be in charge of the project and question him thoroughly about his experience and education. The final selection should be made by the elected officials or executive on the basis of the board's recommendation.

A list of qualified engineering consultants can be obtained from any state association of registered professional engineers or from the following:

American Institute of Consulting Engineers (AICE)
345 East 47th Street
New York, New York 10017
Telephone 212—PL 2-6800

Consulting Engineers Council
1155 15th Street, N.W.
Washington, D.C. 20005
Telephone 202—296-1780

Few elected governing officials have the technical competence to check or revise the consultant's detailed engineering drawings. However, the local government's own engineering and legal staff can review these drawings and specifications for adequacy, clarity, and legality, and to be sure that the locality's purchasing policies will be followed. The detailed plans and specifications are sometimes checked by the state agency responsible for pollution control and by the local health department.

After the state agency and the local government's own staff have approved the plans, and the financial consultant has recommended financing arrangements, a construction and operation schedule must be adopted.

payment

The courts have consistently held that engineering is a profession involving personal services depending upon the peculiar skill or ability of the individual—similar to the professions of law, medicine, teaching—to which the requirements of the states for competitive bidding on public works contracts do not apply. Thus, fees for consulting engineers' services are negotiated.

If an agreement on the fee cannot be reached with the firm with the highest rating, then negotiations should be held with the second firm. Payment for planning and engineering services may be computed in several ways: percentage of estimated or actual cost of construction; fixed lump sum; cost, plus a fixed amount; salary cost times a factor, plus incurred expenses; and per diem.

In New York State, which pays 100 per cent of the cost of local studies, administrative regulations require that engineers' fees for comprehensive solid wastes studies be based on:

1) a lump sum, taking into account reasonable engineering costs for similar studies and reports, or
2) an estimated engineering payroll cost required to perform the work, plus a reasonable amount to cover overhead and profit, as agreed to between the engineer and the state health commissioner, or
3) a combination of (1) and (2).

If the fee to be charged appears unreasonable, officials should seek advice from a recognized engineering society before signing a contract. The American Society of Civil Engineers has published a schedule of fees for professional engineering services; its publication "Negotiated Engineering Contracts Protect Public Interest" is also useful. Other engineering societies may also be consulted.

The following warning was issued by *American City* magazine:

> Be wary of the consultant who offers to deliver the report and recommendations free, if in return, he is retained to design and build the proposed project. Class him with the physician who agrees to diagnose your ills without charge if you, in advance, agree to have him remove your appendix.

steps in staffing a new program

Before a local government begins its planning, a competent administrator is needed to coordinate planning efforts, work with consultants, and direct the solid wastes management system. This person may be a professional engineer, preferably with experience in solid wastes. By appointing the top man in advance of operation of a system, elected officials can obtain his professional judgment during the planning process. It also enables him to be thoroughly familiar with the problems and to offer his own solutions.

Next, elected officials should establish a personnel system, if one does not exist. In local governments which have established merit systems, provisions should be made for incorporation of new employees into the system, and the solid wastes director should establish close working relations with the personnel office.

As soon as collection and disposal methods have been decided, position classification can begin and personnel needs determined. A schedule should be set up to make certain that classification, salary determination, recruiting, hiring, and training are efficiently accomplished in advance of actual collection and disposal operations.

County or city officials should see that the following are available:

- A clear, concise statement of agency personnel policy including employee rights and duties.
- Procedures for periodic review of salaries and fringe benefits and negotiation of contracts with labor unions if they exist.
- Adequate funds for training and obtaining published materials.
- Training programs for all employees.
- Methods for regular reporting by the solid wastes agency to elected county or city officials of personnel information such as turnover, absenteeism, employee evaluation, and accident experience.

summary

The ability to attract and retain good employees is essential to the success of a local solid wastes management system. Many local governments have invested thousands of dollars in equipment, facilities, and sites but have not invested in adequate salaries, wages, training, and benefits to attract and retain competent administrators, engineers, foremen, and manual workers. Solid wastes services are too costly to allow risk-taking with poor-quality personnel who get their jobs on a patronage basis.

Collection and disposal employees should be screened to make certain they are qualified. If it is difficult to find qualified men, a local government should try new recruiting methods and job training. Wages must be comparable to, or better than, those paid for similar work in private or public agencies. Fringe benefits, including hospitalization, retirement, and uniforms, should be provided.

All workers should be carefully trained to perform their jobs safely and efficiently. Solid wastes collection is one of the most hazardous occupations, and local governments are responsible for protecting their employees.

Elected governing board members should insure that employee complaints and suggestions are properly handled. Local officials must also develop policies and procedures for dealing with employee unions where they exist.

In most local jurisdictions, government personnel with the proper skills are not available, so consultants are needed to assist solid wastes agencies. Elected officials must be careful to choose a qualified, experienced consultant.

In setting up a new solid wastes system, the first step is to hire a competent administrator to coordinate planning efforts and work with consultants.

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10 action plan and bibliography

action plan

introduction

America is beginning to recognize that it must protect and conserve its resources and environment through proper management of wastes. Effective water management, air pollution control, and solid wastes management are needed to restore the beauty and healthfulness of man's surroundings. People are no longer willing to accept polluted streams, smoke-filled air, and open dumps. They are demanding safe and aesthetic management of all wastes.

What is needed is the commitment to act, to begin now to manage solid wastes in a way which is not ugly and dangerous, to formulate a comprehensive program for safe and aesthetic solid wastes management. A half-way program is only a half-way solution.

the problem

This is the problem. Every year more solid wastes accumulate—plastics, paper, cardboard, bottles, garbage, and more.

In the United States, the average person yearly discards more than a ton of materials composed of such items as clothing, bottles, garbage, furniture, frozen food wrappers, and yard clippings. The wide assortment of material thrown away is referred to as *solid wastes*. Solid wastes come from many sources: homes, businesses, farms, industries, and institutions.

The annual rate at which solid wastes are generated is increasing by about 5 per cent per person. In addition, the population is growing by approximately two million persons per year. In the "use once and throw away" age of today, over 190 million tons of solid wastes are produced annually; by 1980 this figure will be 340 million tons or more.

Many factors have contributed to this phenomenon. More people can afford to buy more new goods than ever before; and from the consumer's view, convenience is often more important than maintenance. Many items are almost as expensive to repair as to replace (TV sets, furniture, shoes). Many used goods now have little resale value. Rows of "white goods," old enamel washing machines, stoves, and refrigerators, are common at most dumpsites, lined up as tombstones of a dead market. Automobiles, which have little "book" value after three years, are usually junked after seven. With the high cost of labor and technological advances in steel processing, there is no profit incentive to expend $25 worth of time to salvage $14 worth of metal from an old car. As a result, many of these vehicles are abandoned along public roads.

Most habits of solid wastes disposal, such as piling trash in a heap and burning it in open dumps, are no longer adequate or safe. In addition, new materials require the development of new treatment and disposal processes, and more thought must be devoted to the reuse and recycling of materials. The supply of minerals, metals, and materials is not endless. Government must begin to manage wastes in a safe, healthful way and conserve resources. In the long run, economical recycling must be developed so that the wealth of the nation is not squandered or depleted. The more than $3 billion a year spent currently on solid wastes management by government and private industry is sorely inadequate. Money and effort are needed to convert dumps to sanitary landfills, to provide improved collection equipment and practices, and to develop new processing and disposal methods.

Solid wastes are now a national problem because few people have considered good solid wastes management important enough to make it a fact. Poor solid wastes management results in water, air, and land pollution, creating public health problems, economic problems, aesthetic problems, and community eyesores. The public should demand and government should provide proper solid wastes storage, collection, processing, and disposal. Local government must show citizens it can do the job so that the public will support and fund effective solid wastes management programs. If all local governments do not undertake better wastes management soon, the monument to apathy will be a nation stymied by its own wastes.

Local officials should begin now to plan and implement comprehensive systems to insure that all solid wastes are managed in a manner that does not create pollution or threaten community health. Although local government is primarily responsible, state and federal governments should provide leadership, information, and assistance.

Tires, large metal and wooden parts, all commonly called "demolition" material, have been abandoned at this dump, along with stripped old cars.

summary of guides

These ten guides were prepared for local elected officials and interested citizens who need to understand what constitutes good solid wastes management and what must be done to provide this essential service. Since the organization, size, and authority of local government vary greatly across the country, not all of the approaches discussed in these guides will be appropriate in all cases, but the general principles of good solid wastes management are the same. Whether in a small rural county or a multi-county metropolitan area, elected officials and concerned citizens can work together to properly manage all solid wastes.

The subjects of the guides are as follows:

1 **Areawide Approaches**—Relationship of solid wastes management to environmental quality control; need for an areawide approach to insure a comprehensive program; advantages of intergovernmental cooperation.

2 **Legal Authority**—Authority needed by state and local solid wastes management programs from state laws, local charters, and ordinances; adoption of rules and standards; regulation of public and private operations.

3 **Planning**—Who plans; coordination of local and state planning, financing the plan; the planning process; new tools; implementation.

4 **Organization**—Assigning operating responsibilities; local government functions; types of organizational structures.

5 **Design and Operation**—Storage, collection, transfer, processing, and disposal methods.

6 **Financing**—Financial planning; revenue sources such as taxes, bonds, loans, and service charges; purchasing techniques.

7 **Technical and Financial Assistance**—Federal, state, and private financial and technical assistance.

8 **Citizen Support**—Local government actions speak louder than words; going to the public for support; sources of opposition; how to deal with communications media.

9 Personnel—Recruitment, compensation, working conditions, safety, labor-management relations, training; consultants in solid wastes programs.

10 Action Plan—Recommended local, state, and federal action.

Field reports describing particular aspects of local solid wastes programs are used throughout the guides to give specific examples of how various local governments are attempting to solve their solid wastes management problems.

local government's role

Local governments are responsible for the management of solid wastes whether they conduct programs or regulate private operations. Local elected officials should provide leadership to their department heads and the community in maintaining a clean, healthy environment. In many areas, this means that solid wastes management must be coordinated on an areawide basis.

Since the county is an areawide unit of government serving urban, suburban, and rural citizens, county officials are in an excellent position to provide leadership in establishing comprehensive areawide solid wastes management systems. In the past, some county governments have been unwilling to accept responsibility for solid wastes management. But today the public is demanding proper wastes management and counties must respond by providing the operation and regulation needed.

This Action Plan for Solid Wastes Management is the culmination of a year's research and discussion with experts. It included on-site visits with local, state, and federal solid wastes officials and a National Solid Wastes Workshop which brought together experts in a variety of disciplines from both government and private industry. This guide contains recommendations for action by local, state, and federal governments and a selected bibliography for further reading.

All levels of government must work together to implement all phases of this Action Plan.

what should local government do?

basic steps

Local elected officials should begin their solid wastes management program by taking the following basic steps.

1. Determine existing practices of storage, collection, processing, and disposal of all residential, commercial, agricultural, and industrial solid wastes in their jurisdiction.

2. Determine what state and local laws exist regarding solid wastes.

3. Decide what should be done by local governments, areawide government, and private industry, and how they can cooperate to provide the best service to citizens.

4. Convert all unsafe, unacceptable methods of collection, disposal, or reuse, such as the use of open collection vehicles, open and burning dumps, and feeding of uncooked garbage to hogs, to safe and acceptable methods.

5. Provide for safe disposal or reuse of all solid wastes, including residential, commercial, industrial, and agricultural wastes, litter, abandoned automobiles, and other large, bulky items.

6. Insure that methods of solid wastes management do not result in environmental pollution.

7. See that the solid wastes management agency encompasses the largest feasible geographical area of present and predicted solid wastes generation and makes provision for disposal sites that will last at least 20 years.

Frequently, the county is the areawide unit which can meet these requirements. Where a single county is not large enough to solve the areawide solid wastes management problem, the multi-county approach may be best. In some large metropolitan areas where solid wastes problems cross jurisdictional boundaries, councils of government may offer an excellent vehicle to stimulate local officials to think, plan, and act in broad terms of mutual problem areas and to encourage jurisdictions to effect a mutually complementary system for solid wastes management.

Sometimes special purpose governments must be used because of state restrictions or because no other unit of government is possible. In such cases the district is preferred to the public authority because the district embraces a distinct constituency, not merely a group of absentee bondholders. If a special purpose government must be used, it is better to work through existing special purpose governments (where possible) rather than to create new ones.

Jurisdictions can cooperate through various techniques: by jointly performing some or all aspects of a solid wastes management system; by contracting between cities and counties; and by transferring responsibility for a function from one level of government to another. Through these and other techniques, local governments can take advantage of economies of scale to implement an areawide solid wastes management system.

8. Determine whether necessary legal authority has been delegated by the state. If state enabling legislation is not adequate, officials should do as much as possible within existing law and decide what changes are needed. Then, they can work through their state association of counties and other interested groups for passage of comprehensive solid wastes state enabling legislation.

The legal basis for local governments to control solid wastes management is state enabling law. Without this enabling authority, local governments cannot acquire land, develop facilities, or spend public funds to regulate and control solid wastes. To insure that local governments have the necessary powers, legislation should allow political subdivisions to manage wastes in coordination with other environmental protection programs.

Home rule cities and counties must closely examine their charters to be sure they have the authority to plan, regulate, and operate a solid wastes management system.

State legislation should give local governments authority to:

a) acquire land, buildings, and facilities by purchase, lease, eminent domain, and donation;

b) plan and zone for solid wastes processing and disposal sites;

how to proceed

The basketball court these boys are using is constructed on top of a California sanitary landfill, operated with this end use already planned.

c) adopt and enforce necessary ordinances, rules, and regulations;

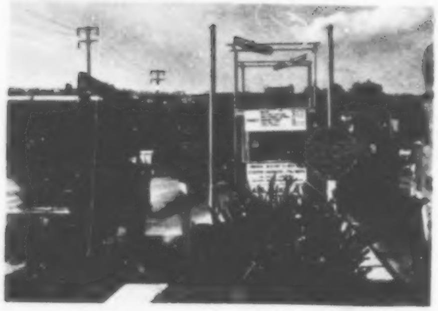
d) use various sources of revenue such as bonds, taxes, general appropriations, fees and service charges, and state and federal assistance programs;

e) make intergovernmental agreements and contracts;

f) establish an agency to administer an areawide solid wastes management system, if needed (the agency's duties and responsibilities should be clearly delineated; and the agency should be responsible to the elected officials of general purpose units of government);

g) regulate private solid wastes operators through the issuance of permits and licenses and the use of franchise or contracts;

h) prohibit any type of environmental pollution.



Landscaping, road markers, and attractive, informative signs greet incoming vehicles at this scale entrance.

9. Enact a comprehensive solid wastes management ordinance.

Ordinances should not be encumbered with technical details which are likely to become outdated. Ordinances should be conceptual in scope, flexible in methods, positive in direction, and prohibitive of any type of air, water, or land pollution.

The ordinance should designate a local agency or agencies to adopt and enforce standards, rules, and regulations; to plan; and, if necessary, to operate a system. The effectiveness of the program will depend on strong enforcement and effective public education.

10. Require that a solid wastes management plan be prepared in coordination with the comprehensive plan for community development.

Plans may be prepared by an interagency committee of interested departments, by a single department, by a consultant, or, by a combination of local departments and consultants.

The solid wastes management plan should include the following:

a) statement of objectives;

b) data on population, land use, and existing storage, collection, and disposal practices;

c) analysis of current and future solid wastes collection and disposal needs, including information on the amounts, location, and characteristics of solid wastes being generated (the rate of solid wastes production is increasing each year and must be considered in the plan);

d) consideration of the climate, topography, geology, and related factors, with the technical assistance of any needed specialists so that selected disposal facilities are not detrimental to the community's land, air, or water resources;

e) presentation and evaluation of feasible immediate and long-range solutions.

11. To prepare the best possible plan and achieve implementation, elected officials should:

a) solicit cooperation on an areawide basis from city and county planners, public works agencies, health officers, engineers, other appropriate departments, and interested citizens;

b) plan to inform the public about the need for a comprehensive solid wastes management program, and work to stimulate public interest and support by building a record of accomplishment through improvements in solid wastes management services while the long-range plan is still on the drawing boards;

c) evaluate the advantages and disadvantages of the proposals recommended by the plan to decide which system is best for the area;

d) provide leadership and initiative to insure acceptance and implementation of the plan.

12. Decide what type of organization is needed and assign operating responsibilities.

No one organizational pattern for solid wastes management can be said to be best. Local conditions and custom will determine whether a separate solid wastes department is needed or whether an existing agency can be assigned responsibility for regulation, collection, processing, and disposal. The solid wastes management agency must be responsible to elected officials of general purpose governments. Regardless of organization, the following functions must be performed: policy making; public information; budgeting; planning and review; drafting, adoption, and enforcement of standards; and operation of the system.

The main criteria for determining what place a solid wastes program should have in the organizational structure of a local government are that the system be easily identified by the public and that it be allocated ample funds, equipment, and personnel. In a small county, one person may be responsible for almost all functions. In a large county, one or more major departments may be necessary. The magnitude of the solid wastes management program will guide the elected governing board in determining whether a separate department is needed.

13. Obtain the best objective technical advice on storage, collection, processing, and disposal and decide which will best meet local needs.

The following general criteria concerning operation should be kept in mind.

- *Wastes must be stored properly while they await collection so they do not cause unsightliness, create odors, or attract rats and flies.*
- *Collection must be organized so that it is accomplished aesthetically, efficiently, and safely. This requires regulation of storage containers, proper equipment, training of crews, and proper routing, scheduling, and supervision.*
- *Disposal, whether by sanitary landfill alone or incineration and sanitary landfill, must be conducted according to the highest operating standards so as not to pollute the environment and endanger public health.*
- *If collection and/or disposal operations are provided by private industry, local government must still provide regulation and uniformity to assure acceptable operation, good service, and equitable treatment of private industry.*

PRIVATE DUMP

Contrast the entrance to this private dump by Cumberland, Md., to the entrance shown on the facing page. Is it any wonder that residents of this area might have negative attitudes about solid waste and its control?

14. Prepare a financial plan and capital budget so that both immediate operating expenditures and long-range capital financing needs are provided for.

Garbage cans line the street on collection day in this city. As usual, one homeowner outdoes himself for the collection crews. Local governments should see that regulations exist to prevent such unsightliness.

Solid wastes management is an essential public service which must be adequately financed. If the local government decides to provide collection and disposal services, then it faces the problem of financing the system. If private industry provides the service, local government is still responsible for regulating fees charged to customers.

Since the system must be financed within the constraints of state laws and local charters, these should be thoroughly examined during the planning process. Local governments can finance the system through the following methods: taxes, bond issues, loans, and/or service charges. The local capital improvement budget should schedule the financing of all necessary solid wastes facilities and equipment.

If the solid wastes management system is operated on an areawide basis, economies of operation will often benefit each jurisdiction.

15. Find out what federal, state, and private technical and financial assistance is available and take advantage of it.

Technical assistance from federal, state, and private sources is available to local officials to develop or expand their solid wastes management systems. On the federal level the primary source of financial and technical assistance is the Bureau of Solid Waste Management, Department of Health, Education and Welfare. Imaginative use of assistance from other federal agencies may provide help for local solid wastes management.

Many states are beginning to provide technical assistance, particularly in the planning field. At present only a few states provide financial assistance.

The solid wastes industry, universities, professional societies, and private organizations also can provide information and assistance.

16. Establish a record of accomplishment in solid wastes management.

In solid wastes management, as in other local activities, actions speak louder than words. Public support for good solid wastes management should be engendered by making immediate improvements in the existing program. During the development of a detailed comprehensive solid wastes management plan, local government can involve organizations and individuals through activities such as illicit dump cleanup, litter control, improved storage, and abandoned automobile removal. Local officials may want to form a citizens advisory committee.

17. Direct solid wastes management agencies to respond quickly to all citizen complaints, and conduct a continuing educational program to inform the public about its rights and duties.

18. Use as many public information tools as possible to reach citizens.

Among these tools are meetings at which slides and films are shown; creation of events such as "go-see" trips; personal *contact by telephone and door-to-door canvass; speakers bureau; brochures and flyers; radio, TV, newspaper, and newsletter coverage and announcements; and communications media endorsement.*

19. Employ a qualified administrator who can direct the solid wastes management system from its earliest stages.

20. Establish a personnel system, if one does not exist. If one exists, see that the personnel office works closely with the solid wastes management agency.

The ability to attract and retain qualified employees is essential to the success of a local solid wastes management system. Many local governments have invested thousands of dollars in equipment, facilities, and sites but have not invested in adequate salaries, wages, training, and benefits to attract and retain competent administrators, engineers, foremen, and manual workers. Solid wastes services are too costly to be mismanaged by poor-quality personnel who get their jobs on a patronage basis.

21. Recognize that recruitment for solid wastes jobs is difficult and take this into consideration when planning for recruitment, training, and compensation.

Collection and disposal employees should be screened to make certain they are qualified. Since it is difficult to find qualified men, local governments should try new recruiting methods and job training programs.

22. Require that all employees receive job training.

All workers should be carefully trained to perform their jobs safely and efficiently. Solid wastes collection is one of the most hazardous occupations, and local governments are responsible for protecting their employees.

23. Establish procedures to review salaries, fringe benefits, and working conditions.

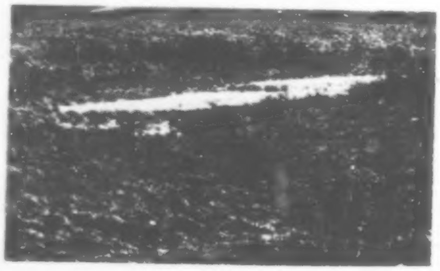
Wages must be comparable to, or better than, those paid for similar work in private or public agencies. Reasonable fringe benefits, including hospitalization, retirement, and uniforms, should be provided.

24. Establish procedures to handle grievances and negotiate contracts with labor unions or employee associations.

Elected governing board members should insure that employee complaints and suggestions are properly handled. Local officials must also develop policies and procedures for dealing with employee unions where they exist.

25. Choose qualified, experienced consultants.

In most local jurisdictions, government personnel with the proper skills are not available, so consultants are needed to assist solid wastes agencies.



Water gathers in low spots of this completed landfill because not enough preplanning on water and soil conditions was done.

what should state government do?

1. Provide comprehensive state enabling legislation to permit counties to manage solid wastes in coordination with other environmental programs.

In most states comprehensive state legislation is urgently needed as an initial step to permit establishment of solid wastes management systems. This legislation must authorize state and local action. State legislation must be broad and conceptual in scope and allow rules, regulations, and minimum statewide standards to be drawn up and enforced by the responsible state agency.

2. Establish a state agency responsible for solid wastes management.

3. Prepare a statewide comprehensive solid wastes management plan in consultation and coordination with local government.

4. Provide technical and financial assistance to local solid wastes management programs.

5. Offer training to local government and private industry in solid wastes management.

6. Permit and encourage cooperation among local governments in establishing areawide solid wastes management systems.

Piles of junk mar the approach to this ocean harbor, preventing it from being the scenic and exciting delight that many big harbors have become.

what should the federal government do?

1. Continue financial and technical assistance to state and local governments.

2. Conduct research on all aspects of solid wastes management, including storage, collection, processing, recycling, and disposal.

3. Promote national awareness of the necessity of maintaining and improving the environment through proper solid wastes management.

4. Encourage and publicize innovation in design and operation.

5. Provide training in solid wastes management.

6. Set an example for state and local governments by practicing good solid wastes management in all federal installations.

national solid wastes workshop participants

The participants in the National Solid Wastes Workshop held in Williamsburg, Virginia, from September 8 through 10, 1968, were very helpful in preparing these guides. They reviewed drafts of the guides and suggested additions, deletions, and changes. The following people participated in the National Solid Wastes Workshop.

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Leo Weaver, Manager, Institute for Solid Wastes, American Public Works Association, Washington, D.C.

Joseph J. Weinstein, Director, Division of Environmental Services, Maricopa County Health Department, Phoenix, Arizona

selected bibliography

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